

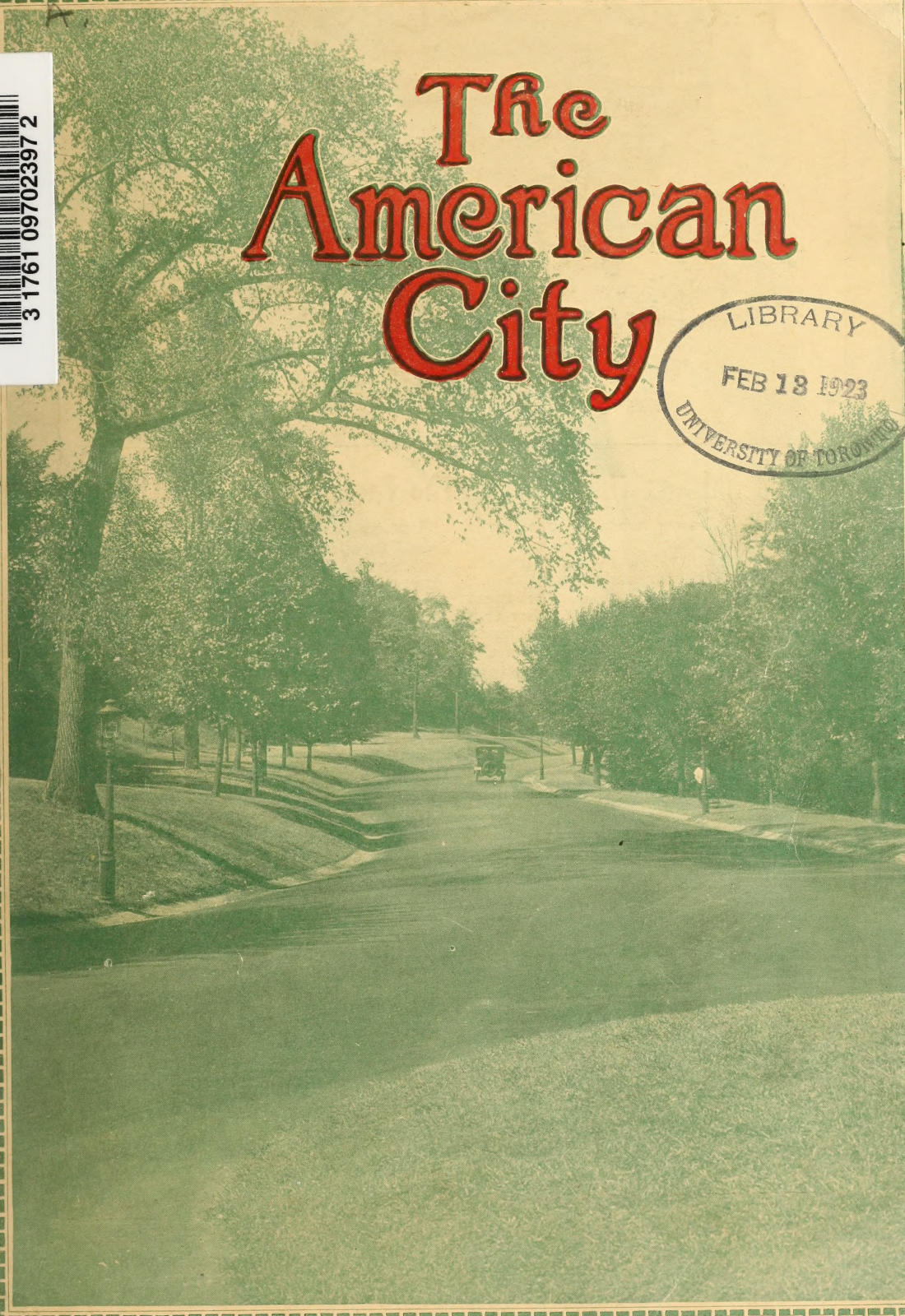
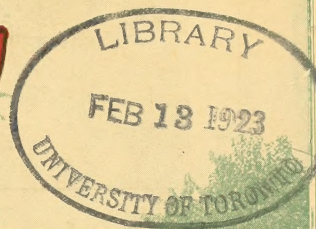
February, 1923

Vol. XXVIII No. 2  
50 Cents \$4 a Year



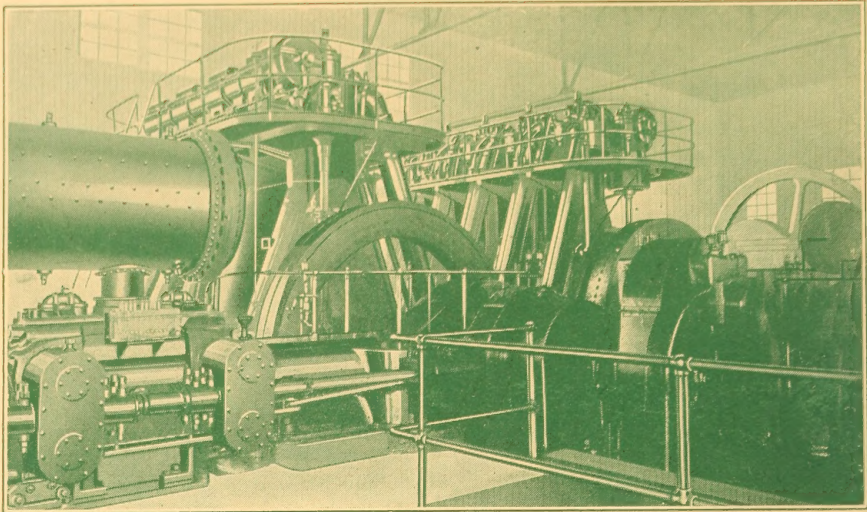
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# The American City



Kansas City has raised more than \$2,000,000 for a war memorial, to consist of a shaft 216 feet in height with buildings on either side, and to be located near the Union Station in a new park which will join Penn Valley Park, shown above





## Two Fultons That Decided The Purchase Of The Third

Two 550 horsepower Fulton-Diesels were installed as power units in a city waterworks in 1914. With a growth of the city that demanded more power, a third Fulton-Diesel of the same capacity was added to the other two in 1916. Today this Fulton-equipped plant of 1650 horsepower is one of the largest Diesel-driven waterworks in America.

The Fulton-Diesel has been selected for many other types of installation for just one reason—low cost of reliable power. Simplicity of construction and operation make this cheap, dependable power practicable for all but the very largest stationary plants.

Plant engineers find the Fulton-Diesel ideal to operate and maintain at high efficiency. To assist them in developing the best type of Diesel practice our supervising engineers make regular visits to all Fulton-Diesel installations. All plant engineers interested in Fulton-Diesel operation are cordially invited to visit our shops at St. Louis.

On request from executives and engineers, our latest illustrated book describing the Fulton-Diesel will be mailed free and postpaid. Our staff of engineers is ready at all times to advise on any power problem—anywhere—without charge or obligation.

**FULTON IRON WORKS COMPANY, ST. LOUIS, U. S. A.**

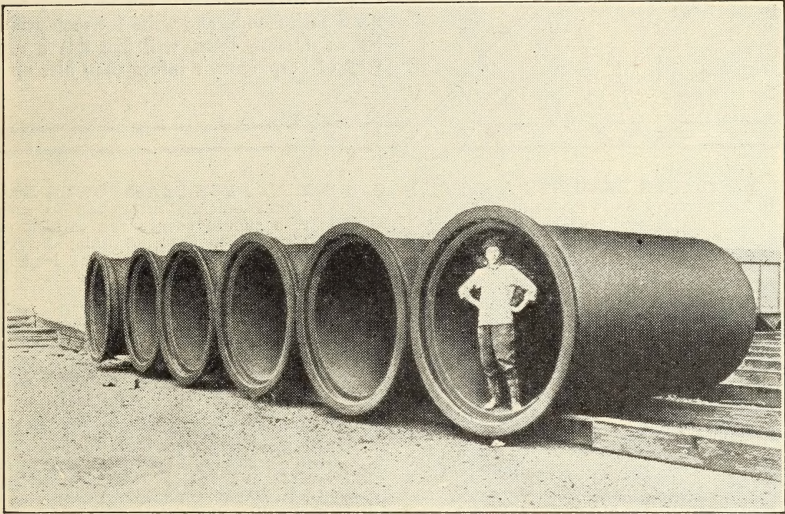
*Successful engine builders for 70 years.*

BRANCH OFFICES: New York—82 Wall St. Dallas, Texas—Praetorian Bldg. New Orleans, La.—Hibernia Bank Bldg. Havana, Cuba—401-402-403 Banco Nacional.

# FULTON DIESEL



## 72" Pipe for Astoria Tunnel



THE employment of **cast iron pipe for gas supply** and distribution is second in importance only to its use for **carrying water**, and its adoption dates from the very inception of the industry, both in this country and in Europe.

AS is well known, **cast iron gas pipe** is laid uncoated in the great majority of cases, and the many instances of its **long life** are, therefore, of special interest, since they prove conclusively that, **against corrosion** or other factors causing deterioration, cast iron possesses **a power of resistance** inherent in the material itself and not dependent solely upon the addition of coatings or other artificial aids.

*Write for a copy of the  
A.W.W.A. Specifications.*

## United States Cast Iron Pipe & Foundry Co.

General Office, Burlington, New Jersey

### SALES OFFICES:

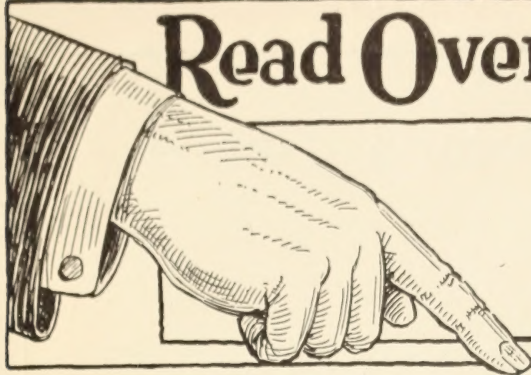
Philadelphia, 1421 Chestnut St.  
Pittsburgh, Henry W. Oliver Bldg.  
New York, 71 Broadway  
San Francisco, Monadnock Bldg.

Chicago, 122 S. Michigan Blvd.  
St. Louis, Security Bldg.  
Birmingham, 1002 American Trust Bldg.  
Dallas, Magnolia Bldg.

Minneapolis, Plymouth Bldg.  
Cleveland, 1150 E. 26th St.  
Buffalo, 957 E. Ferry St.  
Cincinnati, Dixie Terminal Bldg.



# Read Over These Items



THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free of charge. Officials who check over these items each month, and write for such printed matter as interests them, will find this a convenient way of keeping their information files up to date.

## HOW LIGHTING STANDARDS BEAUTIFY A CITY

The literature of the Electric Railway Equipment Co., Cincinnati, Ohio, describes its tubular steel poles for pendant standards or combining street lights and trolley wire supports.

## REPAIRING ASPHALT ROADS

The United States Asphalt Refining Co., 90 West St., New York City, will be pleased to send its circulars describing the uses of Kolmend, a cold material especially adaptable to repairing asphalt roads and for use at railroad grade-crossings in place of timbers.

## DECORATIVE PLANTS, SHRUBS AND HEDGES

The free catalog of Henry A. Dreer, Philadelphia, Pa., which will be sent to any interested municipal officials, describes in detail the Dreer complete stock of decorative plants, palms, ferns, roses, hardy perennials, shrubs, plants, aquatics, etc.

## A 3-TON ROAD ROLLER

The Austin-Western Road Machinery Co., 400 N. Michigan Blvd., Chicago, Ill., has recently brought out a 3-ton gasoline road roller for subgrade rolling. It is described in new literature which will be sent free on request.

## NO MORE CALKING FOR WATER-MAIN JOINTS

Water-works officials who have trouble with the proper calking of lead joints in water-mains will be interested in the literature of the Leadite Co., 100 S. Broad St., Philadelphia, Pa., describing Leadite for joints; this material requires no calking, and saves from 50 to 75 per cent in the cost of making joints.

## THE EFFECT OF HARD WATER ON BOILERS

In a particularly interesting booklet, "Interest on Deposits," the Graver Corp., East Chicago, Ind., describes the losses in a power-plant through the incrustation caused by hard water.

## AN AUTOMATIC CALCULATING MACHINE

In the latest literature of the Monroe Calculating Machine Co., Orange, N. J., municipal officials will find interesting data regarding the new portable, automatic machines which add or multiply, subtract or divide simply by touching a designated bar.

## PORTABLE DRILLING RIGS

Bulletin 377-D, issued by the Sullivan Machinery Co., 125 S. Michigan Ave., Chicago, Ill., describes in detail Sullivan portable drilling rigs, including portable compressors and rotators.

## MAKING BETTER DIRT ROADS

The York Modern Corp., Unadilla, N. Y., has just issued a booklet, "Better Dirt Roads at Less Expense," describing in detail its power stone rake, which quickly puts dirt roads into condition.

## DOUBLE-SUCTION CENTRIFUGAL PUMPS

In Bulletin D-1, the Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass., describes in detail its efficient line of double-suction, split casing pumps of the impeller type for water-works service.

## BRONZE HONOR ROLLS

Reed & Barton, bronze founders, Taunton, Mass., have prepared a particularly artistic loose-leaf booklet for municipal officials and civic organizations, containing a selection of suggestions for tablets, memorials and honor rolls. These indicate exceptional originality in expressing sentiment and subject matter through the medium of symbolical design.

## GAS ENGINES FOR PEAK POWER LOADS

Power-plant officials interested in securing a lower electric rate should secure the catalog of the Sterling Engine Co., Dept. C-11, Buffalo, N. Y., telling how Sterling gas engines used for peak load service pay for themselves in about two years.

## REDUCE LAWN-MOWING COSTS

Department E of the Jacobson Mfg. Co., Racine, Wis., will send on request a copy of its booklet, "The Lawn Beautiful," describing the service rendered by the "4 Acre" power lawn-mower, which does the work of four or five men with hand mowers.

## SOLVING SEWER-CLEANING TROUBLES

The Champion Corp., 338 Chicago Ave., Hammond, Ind., will be pleased to send to any interested officials its complete descriptive literature telling of the work of the O. K. Champion sewer-cleaning machine, which it is claimed will solve sewer-cleaning troubles.

## POUR WET CONCRETE BY CONVEYORS

An illustrated folder recently issued by the Barber-Greene Co., Aurora, Ill., will be sent to anyone desiring to know a low-cost method of placing concrete by means of a portable belt conveyor, which represents an intermediate step between the wheelbarrow gang and the chuting plant in placing concrete.

## STONE SPREADER PAYS FOR ITSELF

The Burch stone spreader, which saves its price in the first mile of stone spread in road work, is described in detail in literature which may be secured from Dept. A-2, The Burch Plow Works Co., Crestline, Ohio.

## RUST-RESISTING CULVERTS

The latest booklet issued by the Newport Culvert Co., 542 W. Tenth St., Newport, Ky., describes in detail its rust-resisting corrugated metal culverts made in half-round and round types for all drainage conditions.

## MOTOR TRUCKS FOR CITY WORK

The engineers of the Garford Motor Truck Co., Lima, Ohio, will be pleased to send helpful data regarding the use of motor trucks in solving various hauling problems which arise in municipal street cleaning, garbage and ash collection and other hauling services.

## FREE TEXT-BOOK ON SWIMMING POOLS

The Associated Tile Manufacturers, Beaver Falls, Pa., has issued a particularly well-prepared handbook on swimming pools and their construction, for the use of municipal officials and civic organizations considering the construction of community swimming pools.

## STOP THIEVERY FROM MUNICIPAL PLANTS

The value of Page protection fencing around municipal lighting plants, pumping-stations, storage yards and supply depots is told in detail in the literature of the Page Fence and Wire Products Assn., 215 N. Michigan Ave., Chicago, Ill.

## MOTOR FIRE APPARATUS

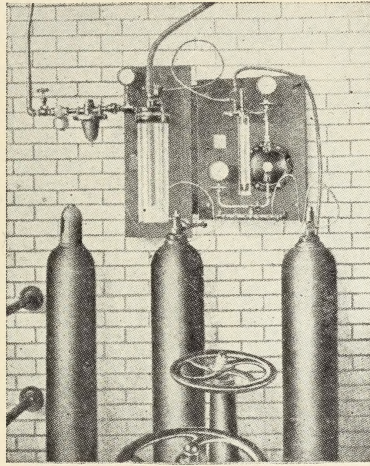
A complete catalog of motor apparatus for smaller cities and towns may be secured from the Foamite-Childs Corp., 302 Turner St., Utica, N. Y.

## MOTOR BUSES IN CITY SERVICE

The White Co., Cleveland, Ohio, has recently issued a new 24-page booklet giving a wealth of information on the use of motor buses in city service.

See additional items on page 6





*Type of W & T equipment installed at Baltimore, Md.*

## 13,769 Cases of Typhoid Fever

have been prevented in the State of Maryland since 1914 by the adoption of efficient sanitary measures. This represents, according to the estimate of the Bureau of Statistics of the State Department of health, a saving of 1150 lives and \$6,781,900 in vital capital.



In Maryland, as elsewhere, the chlorination of drinking water has played a vital role in this wonderful reduction of Typhoid Fever.

In Maryland there are thirty-five W & T Chlorinators in operation and there, as elsewhere, this public health insurance costs less than one cent per capita per year.

*How about Your Community?*



**WALLACE & TIERNAN**

COMPANY, INCORPORATED

*Manufacturers of Chlorine Control Apparatus*

NEWARK

NEW JERSEY





# Read Over These Items

*You can secure any or all free of charge if mention The American City*

## STEEL FABRIC FOR REINFORCING ROADS

Complete information regarding the value of steel fabric in reinforcing concrete roads may be secured from the National Steel Fabric Co., 700 Union Arcade, Pittsburgh, Pa.

## WATER-WORKS SUPPLIES

The H. W. Clark Co., Mattoon, Ill., has published an interesting loose-leaf catalog, No. 20, containing its various bulletins, and describing its meter boxes and various castings for water departments.

## HOW TO USE PORTABLE BELT CONVEYORS

In Booklet 1022, The George Haiss Mfg. Co., 143rd St. and Rider Ave., New York City, describes its portable belt conveyors for handling materials with a minimum physical effort, and illustrates with diagrams and text many practical uses of these conveyors.

## TRAFFIC SIGNALS THAT DECREASE ACCIDENTS

Complete information regarding the Lehman traffic guide, a traffic regulator which only rises slightly above the surface of the street and which is readily visible day and night, is described in the literature of the Elkhart Foundry & Machine Co., Elkhart, Ind.

## ROAD CONSTRUCTION WITHOUT DETOURS

In its new booklet, "Non-Detour Construction," Warren Bros. Co., 9 Cambridge St., Boston, Mass., describes in detail the use of Warrenite-Bitulithic pavement in the construction of city streets and suburban highways without the need of detours.

## CLEAN STREETS BY FLUSHING

City officials interested in having clean pavements should secure the cost data and literature issued by the Municipal Supply Co., South Bend, Ind., on motor street flushing.

## A LAWN-SPRINKLING SYSTEM

In the literature of John A. Brooks, 10226 Woodward Ave., Detroit, Mich., municipal officials, particularly park superintendents, will find very interesting information regarding the Brooks system of lawn sprinkling and sub-irrigation, which is helpful in keeping lawns in excellent condition.

## SUPERIOR QUALITY FIRE HYDRANTS

Darling Valve & Mfg. Co., Williamsport, Pa., will be pleased to send its literature describing Darling fire hydrants and gate valves which are claimed to be a simplified yet mechanically perfect product.

## LONG-LIVED STREET BROOMS

Number 500, the most popular municipal push-broom in the United States, made by the Osborn Mfg. Co., Inc., Cleveland, Ohio, is described in detail in the price list which this company will be pleased to send to any interested municipal officials.

## ATTRACTIVE WALL CALENDAR

Fire departments and other municipal officials who would like to receive a copy of the extra large American-La France calendar, which is particularly decorative, may secure copies by writing to F. B. Gridley, American-La France Fire Engine Co., Inc., Elmira, N. Y., on their official letterheads. They will be supplied with calendars while the stock lasts.

## PROTECTING SHADE AND ORNAMENTAL TREES

Department 42, the B. G. Pratt Company, 50 Church St., New York City, will be pleased to send to any municipal or park official complete information about Scalecide, a complete dormant spray which has been used by many of the largest park departments for many years in controlling scale and fungus growths.

## FINE-CUT LAWNS AT LOW COST

Model L motor lawn mowers which are capable of cutting six acres of rolling lawn in parks and golf courses are described in detail in literature which may be secured from the Coldwell Lawn Mower Co., Newburgh, N. Y.

## AMBULANCE AND PATROL WAGON BODIES

Department M of the Hoover Body Co., York, Pa., will be pleased to send its new catalog describing the types of bodies this company is prepared to make for police patrols and ambulances and for municipal use.

## FENCING FOR SCHOOLHOUSE ENCLOSURES

Unclimbable fences made of Excelsior chain-link fencing for enclosing school house lots are described in detail in literature of the Wickwire Spencer Steel Corp., 41 East 42nd Street, New York City.

## WEED-FREE LAWN SEED

A new booklet, "The Seeding and Care of Lawns," recently issued by O. M. Scott & Sons, Marysville, Ohio, is available without charge for municipal park, playground and cemetery officials.

## STREET LIGHTING EFFICIENCY

The Macbeth-Evans Glass Co., Pittsburgh, Pa., has issued particularly instructive literature on street lighting problems which it will be pleased to send gratis to readers of THE AMERICAN CITY on request.

## MACHINES THAT MAKE GOOD ROADS

A very complete catalog of special interest to road builders describing all types of Russell road machines, including elevating graders, patrol maintenance machines, scarifiers, road drags, wheel scrapers, draglines, gravel screening and loading equipment, culverts, steel beam bridges, etc., may be secured from the Russell Grader Mfg. Co., Minneapolis, Minn.

## STEAM TURBINES AND PUMPS

In its new catalog, "P," the De Laval Steam Turbine Co., Trenton, N. J., gives an interesting, short history of the De Laval Works, and makes a handy booklet of ready reference to all its products, including steam turbines, direct-current generator sets, small turbo-alternators, centrifugal pumps, pumps for electric motor drive, steam turbine-driven pumps and the well-known De Laval double-helical gears.

## VALVES FOR EVERY SERVICE

The catalog of the Kennedy Valve Mfg. Co., Elmira, N. Y., lists 500 types and sizes of Kennedy valves for all kinds of water-works service.

## CAST IRON WATER-MAINS

The Lynchburg Foundry Co., Lynchburg, Va., will be pleased to quote prices and give information regarding the use of cast iron pipe for water-mains and distribution systems.

## STEEL RUBBISH CANS

The Cleveland Wire Spring Co., E. 38th St. and Hamilton Ave., Cleveland, Ohio, will be pleased to send its literature describing its heavy-gage sheet steel waste paper and rubbish cans with reinforced hoods.

## ACCURATE WATER-METERS

In the literature of the Gamon Meter Co., Newark, N. J., you will find interesting information regarding the "Watch Dog" water-meter, which is a guardian against leaks, water theft and waste.

## ELECTRIC METER SERVICE SWITCHES

The service and usefulness of Type WJ-54 Westinghouse Meter Service switches, giving a standardized protective system, is described in detail in literature which may be secured from the Safety Switch Section, Westinghouse Elec. & Mfg. Co., Mansfield, Ohio.

## TRUCK TIRES FOR HEAVY SERVICE

The service of Caterpillar tires for road-building trucks, street sprinklers and flushers, garbage trucks, fire apparatus and passenger busses is discussed in the literature of the Kelly-Springfield Tire Co., 250 W. 57th St., New York City.

## HIGH-GRADE LAWN-MOWERS

In the Pennsylvania Trio Book, the Pennsylvania Lawn Mower Works, Inc., 1615 N. 23rd St., Philadelphia, Pa., tells in detail of the work of the Pennsylvania trio mower tractor-driven or horse-drawn, and the Pennsylvania golf hand mower, all of which are particularly adapted to municipal grass-cutting service.

## DIESEL ENGINES FOR POWER-PLANT SERVICE

The Buesh-Sulzer Bros. Diesel Engine Co., St. Louis, Mo., will send free on request its up-to-date literature telling of the dollars-and-cents savings in municipal power-plants using Diesel engines.

## AUTOMATIC STREAM DRINKING FOUNTAINS

Municipal officials interested in a practical automatic stream-controlled sanitary drinking fountain for public use should secure the complete catalog of the Halsey W. Taylor Co., Warren, Ohio.

## PLANTING SUGGESTIONS

The annual catalog of W. Atlee Burpee Co., Philadelphia, Pa., contains many interesting suggestions for municipal plants. A copy of this catalog may be secured on request by any reader of THE AMERICAN CITY.

## AN UP-TO-DATE CATALOG ON SPIRAL PIPE

The American Spiral Pipe Works, P. O. 485, Chicago, Ill., has just issued a new catalog, No. 22-1, on Taylor spiral riveted pipe, containing many new features, illustrations and data of value to the water-works and hydraulic engineer.

## HIGH-GRADE WATER-METERS

The literature of the Badger Meter Mfg. Co., 841-847 Third St., Milwaukee, Wis., describes in detail its new Model A frost-proof meter, made in sizes from 3/4 to 4 inches, inclusive, and having an unusually large capacity.



THE AMERICAN CITY

# MATHIESON Chemicals

## First in Service

**T**O render greater service to our customers, we have developed a means of filling our containers with a uniform weight of Liquid Chlorine. In future Mathieson cylinders will have exact net weights of 105 and 150 pounds.

That this is a distinct step forward in the marketing of Liquid Chlorine will be apparent to all users in both industrial and water-works fields and illustrates the progressiveness of our organization in rendering maximum service to our customers. Let our engineers help you with your water purification problems.

**MATHIESON ALKALI WORKS** INC

25 West 43rd Street

**NEW YORK CITY**

PHILADELPHIA

CHICAGO

PROVIDENCE

CHARLOTTE



**Deal Direct with the Manufacturer**



# Many Unsightly Wooden Poles-

Poles of all sizes and all shapes from the old sawed, square redwood poles to the unpainted, round cedar poles used by the various public utilities, leaned in all directions and destroyed the beauty of this street in Richmond, Calif.



The main street of any city or town should have a neat, businesslike appearance. This is impossible when there are innumerable unsightly wooden poles sticking up at odd angles. Our engineers have helped many communities to overcome this trouble through the installation of Elreco combination tubular steel poles.

**The Electric Railway Equipment Co.**

**CINCINNATI, OHIO**

**30 CHURCH ST.**

**NEW YORK**



## or a few Steel Standards

Then Richmond, Calif., installed steel poles, 37 feet long, set 6 feet in concrete foundations. These poles, placed three in each block throughout 28 blocks, carry the electric light wires as well as the trolley wires and add distinction to the thoroughfare.



We shall be pleased to help you to improve the appearance of your streets through an installation similar to that in Richmond, Calif., at moderate expense, giving a permanent White Way System which will be a source of local pride and advertise the progressiveness of your community.

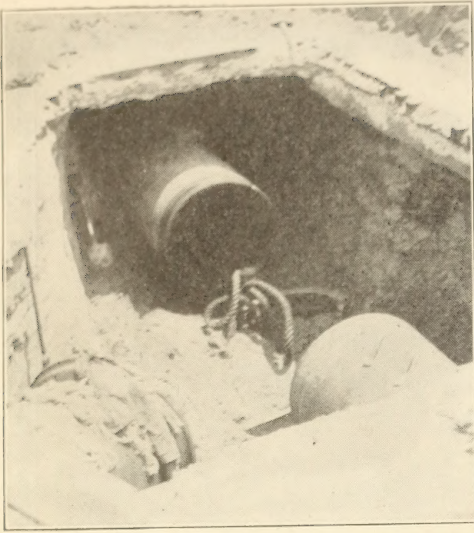
**The Electric Railway Equipment Co.**

CINCINNATI, OHIO

30 CHURCH ST.

NEW YORK





## Connections easily made

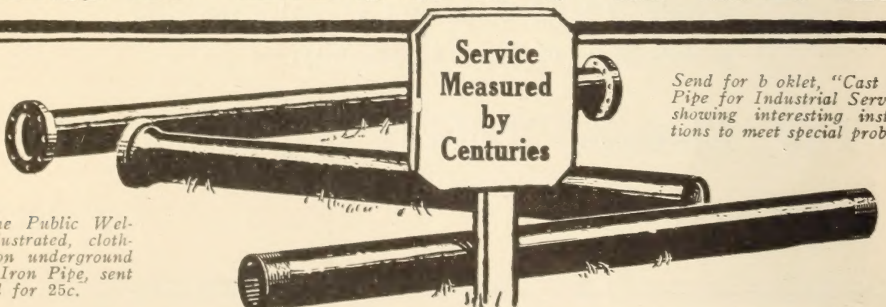
THE picture at the left shows a 36-inch main which was laid in Sixty-seventh Street, Chicago, in 1893. A piece was cut out, as shown, and a 36 x 36 inch Y was installed to connect with a new line laid in 1922. The finished job is shown at the right.

Cast Iron Pipe simplifies a job of this kind considerably. The fact that Cast Iron Pipe is made in standard sizes, and maintains its contour under all conditions, makes it possible to provide fittings in advance of work, without digging up and measuring the pipe at the exact point. For large connections, pipe is easily cut in place, using the regular construction forces and equipment. Joints on repair work are made exactly like joints in the original installation. For service pipe connections, the thickness of metal is sufficient to hold the corporation ferrule without the use of saddles.

THE CAST IRON PIPE PUBLICITY BUREAU,

Erie and St. Clair Streets, Chicago

# CAST IRON PIPE

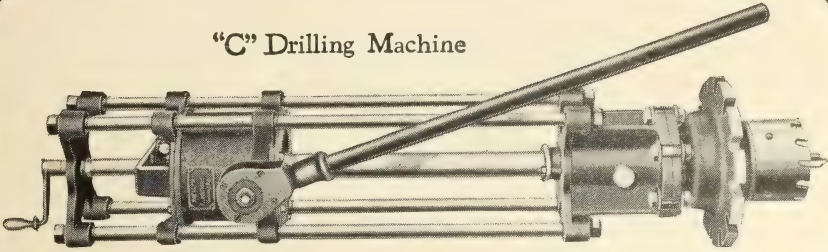


"Pipe and the Public Welfare," an illustrated, cloth-bound book on underground uses of Cast Iron Pipe, sent postpaid for 25c.

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems



"C" Drilling Machine



## ***The New MUELLER Drilling Machine No. "C"***

For making lateral or branch connections in gas or water mains, the New "C" Machine has no peer for speed and ease of operation.

The ratchet handle, inclosed bevel gear drive, automatic feed, and skeleton form of construction are all features that insure superior service in making connections from 2" to 8" inclusive, in pipe from 4" to 48" in size.

Shipped in a good strong, nicely painted box which answers as a permanent chest. Regular compartments for tools.

Write for detailed information and prices.

**H. MUELLER MFG. CO., Decatur, Ill., U. S. A.**

PHONE BELL 153

**Water, Plumbing and Gas Brass Goods and Tools**

New York City, 145 W. 30th St.

San Francisco, 635 Mission St.

Phone Watkins 5397

Sarnia, Ontario, Canada

Phone Sutter 3577

Mueller Metals Co., Port Huron Mich., Makers of "Red Tip" Brass Rod; Welding Rod; Brass and Copper Tubing; Forgings and Castings in Brass and Bronze; also Brass Screw Machined Product



# Chemicals for Water Purification

We manufacture the highest grades of

**Sulphate of Alumina**  
**Chloride of Lime**  
and  
**Liquid Chlorine**

**PENNSYLVANIA SALT MFG. CO.**

WIDENER BLDG.

::

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PHILADELPHIA, PA.

## NORWOOD FILTERS

Designed to meet all  
Water Purification  
Requirements.

**RE-FILTRATION  
SYSTEMS  
for  
SWIMMING POOLS**

*Write for Information*

**NORWOOD ENGINEERING CO.**  
FLORENCE, MASSACHUSETTS

### THE WATER SUPPLY of Swimming Pools

with Data on Design, Construction and Operation

BULLETIN 500

JUNE 1917



**GRAVER Corporation**

OF CHICAGO, ILLINOIS

East Chicago, Indiana

*Send for this Book*

### Swimming Pools

can be economically furnished with pure water at correct temperature by the Graver Refiltering or Recirculating System. Complete system comprises Filters, Heaters, Coagulant and Sterilizing devices. Layouts and prices furnished without obligation.

*Ask for Bulletin 500, containing drawings, data and general information.*

**Graver Corporation**  
East Chicago, Indiana

## INTERNATIONAL GRAVITY FILTRATION PLANTS

THROUGH the years, the International Filter Co. has been the first to adopt improvements—the first to discard features that have proved hindrances of progress. The result has been that International equipment has maintained its leadership; that it is first now as always.

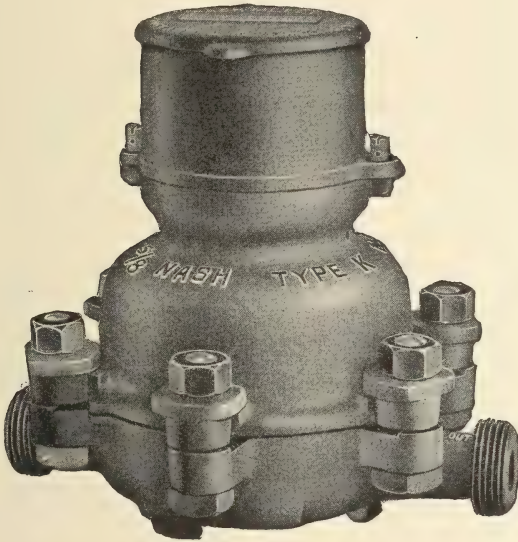
**INTERNATIONAL FILTER CO.**

Water Softening and Filtration Plants  
Works and General Office: 333 West 25th Place, Chicago

New York Pittsburgh Buffalo San Francisco  
Canadian International Filter Co., Ltd., Toronto.



# NASH TYPE K DISC WATER METERS



ALL BRONZE CONSTRUCTION; SPLIT CYLINDER — NO SCREWS; LARGE SLOW-MOVING DISC; ENCLOSED INTERMEDIATE; STRAIGHT READING REGISTER; FROST PROTECTION FEATURE.

## SIMPLE—STRONG—SATISFACTORY

We have been making Nash meters since 1888 and the Type K contains every worth-while improvement that has been developed during that period. We recommend it confidently as the best Disc Water Meter on the market today.

We have just published a fully illustrated folder, which we will be pleased to send on request, showing all the details of this meter.

*Ask for Bulletin 200*

## NATIONAL METER COMPANY

299 BROADWAY, N. Y.

CHICAGO, ILL.: 1455 West Congress Street

CINCINNATI, O.: 415 Sycamore Street

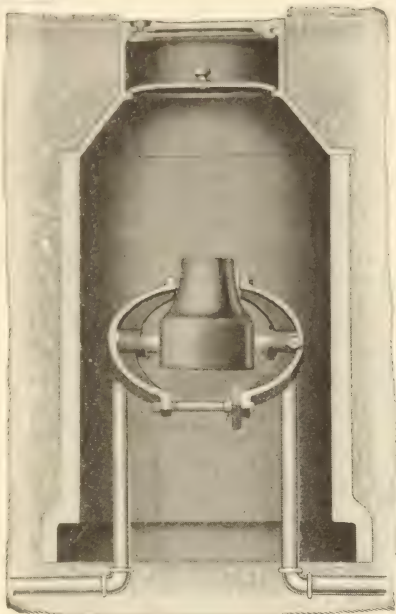
BOSTON, MASS.: 287 Atlantic Ave.

ATLANTA, GA.: 251 Ivy Street

SAN FRANCISCO, CAL.: 141 New Montgomery St.

LOS ANGELES, CAL.: 251 Central Avenue





## 30° Below Zero and not a meter out of commission

"We have experienced no trouble with freezing with the temperature as low as 30 degrees below zero," writes the superintendent of the Water Department in Waukesha, Wis., commenting on Ford Meter Boxes.

This is not the only case, for water works men of the East, West and Middle West—in cities where Ford Meter Boxes have been in operation during the severest weather—have given testimony to the absolute protection afforded by Ford Meter Boxes.

In cities where water enters the box at freezing temperature, the conservation of every possible heat unit is necessary. The patented Wabash Double-Lid Cover, shown above, accomplishes this purpose—it removes all danger of freezing. Its patented construction retains all the heat given off by the meter as well as the heat rising from the bottom of the box.

Wabash Double-Lid Covers are recommended for all locations north of the 39th parallel—because they make meters freeze proof.

Write for Catalog—today.

**The Ford Meter Box Co.**  
406 S. Carroll Street  
**Wabash Ind.**

**EVERYTHING FOR THE METER  
SYSTEM EXCEPT THE METER**

Builders Iron Foundry  
New England Representatives

# Pure Water

We manufacture filters for all domestic, industrial, and municipal requirements.

For over twenty-five years Roberts Filters have been supplying pure, clean water.

*Write for descriptive  
literature.*

**Roberts Filter Mfg. Co.**  
DARBY, PA.



**GRAVITY PRESSURE  
FILTERS  
HYPOCHLORITE APPARATUS**

**ALL VARIETIES OF  
CHEMICAL FEEDING DEVICES**

*Write for Bulletin 17-3*

**THE NEW YORK CONTINENTAL  
JEWELL FILTRATION CO.**  
NUTLEY, N. J.



*Equally  
good service*

*For the Small Consumer  
and the Large Consumer  
Drawing from the Same  
Pipe Line.*

Have you ever been up against the proposition of supplying a large water consumer and a small one from the same pipe line where the large consumer's demand is subject to wide and rapid fluctuation? The pipe line may be capable of furnishing the full amount needed by the large consumer without affecting the domestic pressure, provided the large quantity of water can be delivered at a reasonable rate.

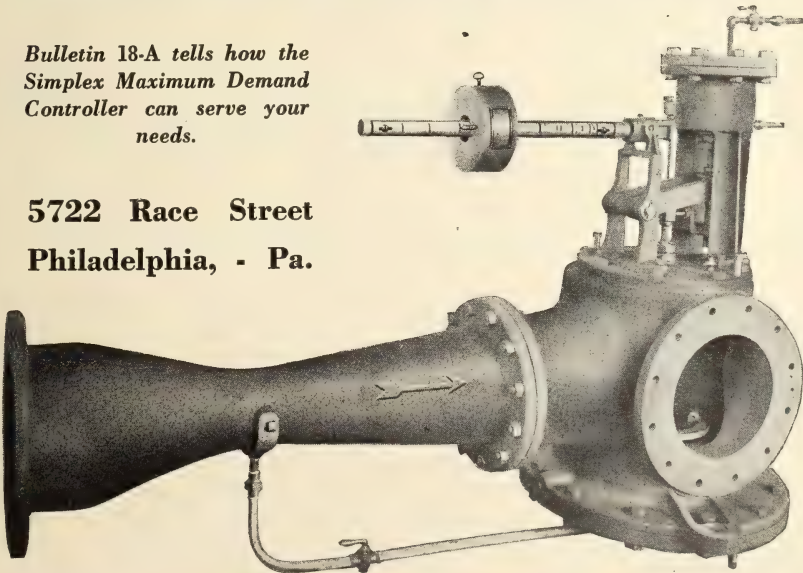
## **The Simplex Flow Controller**

has been successfully adapted to prevent the drop in pressure due to such flow demands on the water supply mains. When installed it remains wide open until the rate of flow reaches the prescribed maximum. It then automatically throttles and permits only the specified rate of flow.

### **SIMPLEX VALVE AND METER COMPANY**

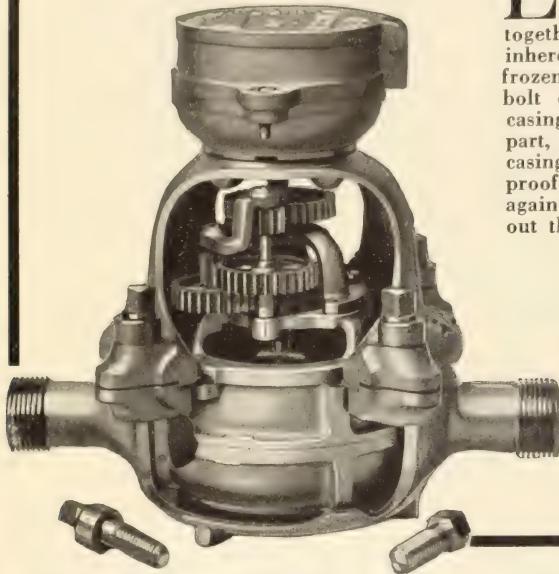
*Bulletin 18-A tells how the  
Simplex Maximum Demand  
Controller can serve your  
needs.*

**5722 Race Street  
Philadelphia, - Pa.**





# FROST PROOF METERS



**L**AMBERT FROST-PROOF METERS are the most efficient, simplest and easiest water meters to take apart and put together again. Long life and accuracy are inherent qualities with these meters. When frozen the patented non-corrosive yielding bolt device permits the top and bottom casings, disc chamber and gear train to part, thereby preventing any damage to the casing or internal mechanism. This frost-proof device can be used over and over again after the meter has been frozen without the need of any new parts.

*Complete descriptive literature  
sent at your request.*

## THOMSON METER CO.

100-110 Bridge St., Brooklyn, N.Y.

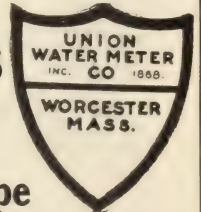


## Compound Water Meters

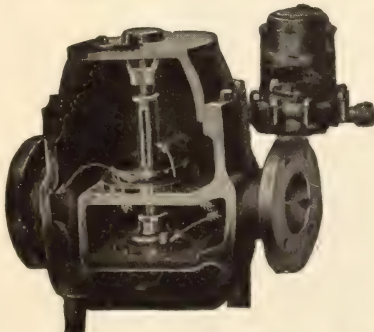
A Union  
Compounding  
Valve

# PLUS

Your  
Current Type  
Meter



### Produces an Accurate Compounding Unit



If your large meter does not register small flows and you wish to increase revenue, try the compound. Bolt the Union Compounding Valve to the outlet end of any meter in sizes from 2 to 8 inches and tap the inlet side of your large meter and pipe to the by-pass meter and you have built a highly efficient compound meter at a cost way below that of a complete new compound without disturbing your service lines.

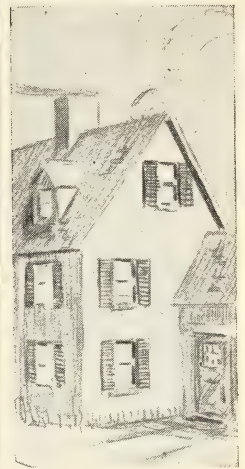
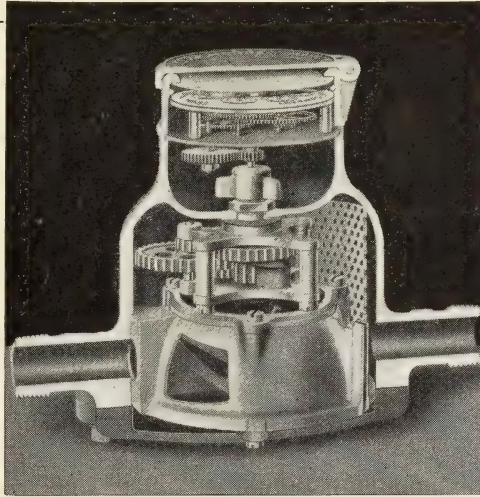
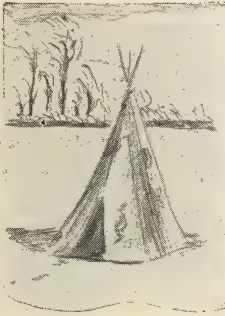
*Catalog A52 gives full information and prices,  
will be sent gladly on request.*

**UNION WATER METER CO.**

**Worcester, Mass.**



# FOUR HUNDRED YEARS



## All Endurance Records Broken

A 5/8" Hersey Disc Meter No. 835,514 on an endurance test at the Meter Testing Laboratory of the Water Department at Newark, N. J., registered 3,902,164 cubic feet of water without being repaired or even opened for examination. It was tested for accuracy and sensitiveness at each 100,000 cubic feet, and these tests showed a falling off in accuracy the first million feet of but 4/10ths of one per cent, 1-5/10ths the second, 1-4/10ths the third and 7/10ths the last 902,164 feet, or but 4% all together.

The Meter continuously responded to the sensitive test of a 1/64" stream from the first and through all tests to the very last.

### 400 Years

The test was "continuous running" at a rate of about 3-3/5 cubic feet or 27 gallons per minute from February 27th, 1920, to March 28th, 1922.

3,955,364 cubic feet of water is equal to 400 years' service at 10,000 feet per year.

# HERSEY

## MANUFACTURING COMPANY

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COLUMBUS, OHIO . . . . . 211 Schultz Bldg.

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CHICAGO, ILL. . . . . 10 So. La Salle Street

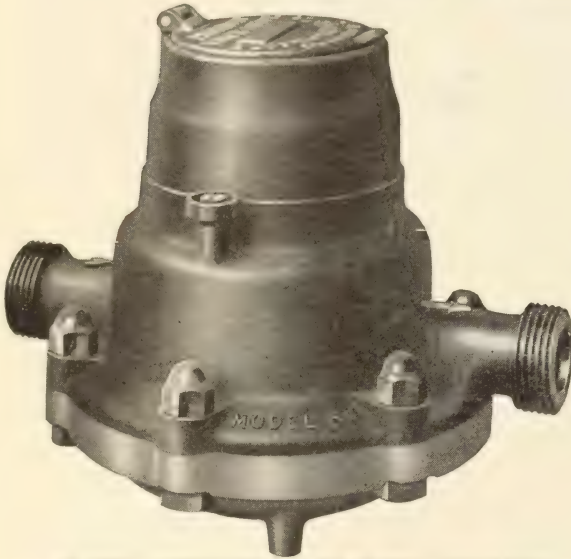
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SAN FRANCISCO, CAL. . . . . 742 Market Street





# AMERICAN AND NIAGARA WATER METERS



5/8-INCH AMERICAN METER WITH BREAKABLE  
FROST BOTTOM

## General Specifications

**OUTSIDE CASING**—The Frost Proof American Meter shown here is one of the four different casings in which American and Niagara meters are built.

**REGISTER**—Round or straight reading optional.

**DIAL FACE**—Indicating Cu. Ft., U. S. Gals., Imp. Gals. or Litres.

**COUPLINGS**—Bronze, standard length and thread.

**METER**—Standard length and pipe thread.

**WORKS**—Made of bronze, hard rubber and nickel silver. Disc chamber, intermediate gears and strainer all released by unbolting flange.

**DISC**—Hard Rubber reinforced with thin metal plate—buoyant yet strong.

**INTERMEDIATE**—Three gears revolving on pivot bearings. Gear plate mounted on measuring chamber. Rubber bush driving shaft. Renewable roller post.

**SAND PROOF**—Submerged bearings protected against foreign matter.

Send for sample meter and prices.

**BUFFALO METER CO.,**  
2902 Main Street,  
BUFFALO, N. Y.

## WATER METERS

KEYSTONE  
KEYSTONE TYPE W  
ARCTIC FROST BOTTOM  
EUREKA  
KEYSTONE-COMPOUND



If it is a *Water Meter* service these meters will handle it satisfactorily.

### PITTSBURGH METER COMPANY

General Office and Works  
EAST PITTSBURGH, PA.

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KANSAS CITY, Mutual Bldg.	LOS ANGELES, Union Bank Bldg.

## WATER WORKS EQUIPMENT MATERIALS AND SUPPLIES

A line designed and manufactured from an actual knowledge of Water Works needs by water works engineers.

## THE CLARK METER BOX

Scientifically houses and protects the water meter in every climate and under all conditions.

Send for General Catalogue No. 20.



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Everything for the  
Water Works

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New York  
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Memphis  
Salt Lake City

San Francisco  
Chicago

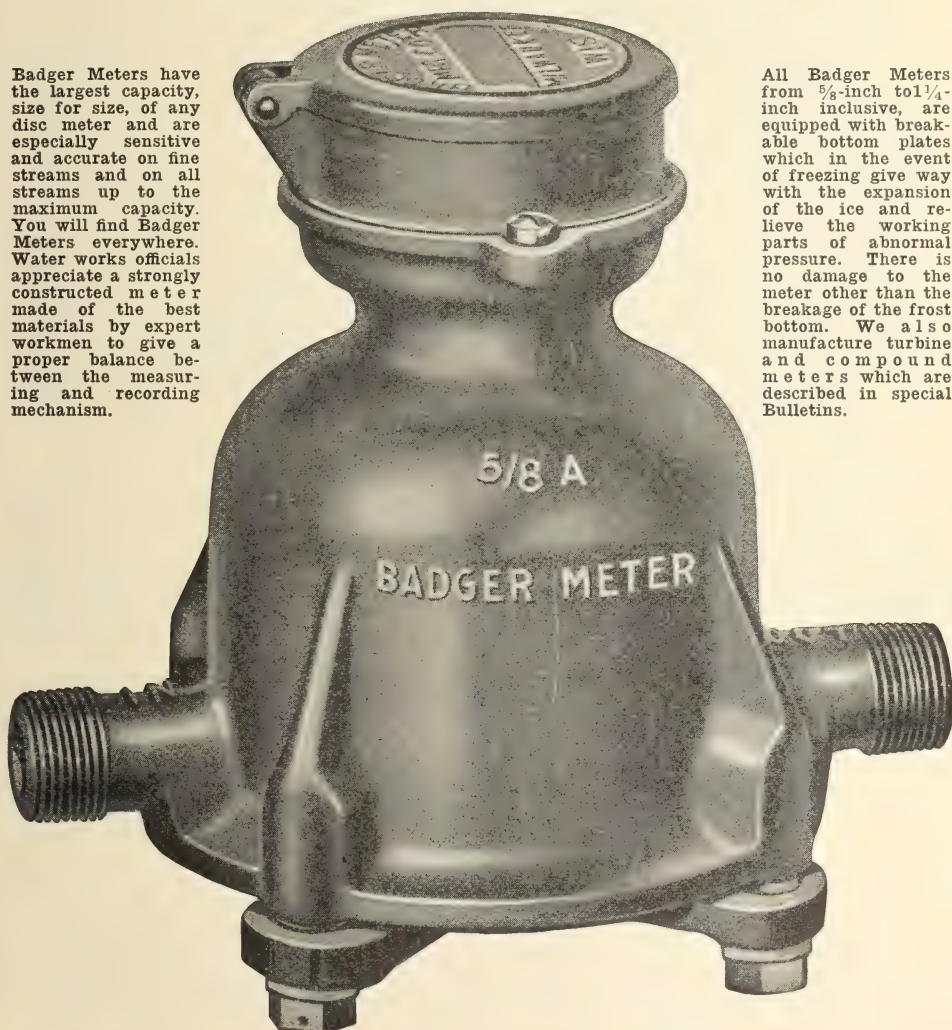


# HIGHEST GRADE WATER METERS

ACCURATE, SENSITIVE, DURABLE AND EFFICIENT

Badger disc meters, made in sizes  $\frac{5}{8}$ -inch to 4-inch inclusive are designed for domestic and industrial service where the demand is moderate

Badger Meters have the largest capacity, size for size, of any disc meter and are especially sensitive and accurate on fine streams and on all streams up to the maximum capacity. You will find Badger Meters everywhere. Water works officials appreciate a strongly constructed meter made of the best materials by expert workmen to give a proper balance between the measuring and recording mechanism.



All Badger Meters from  $\frac{5}{8}$ -inch to  $1\frac{1}{4}$ -inch inclusive, are equipped with breakable bottom plates which in the event of freezing give way with the expansion of the ice and relieve the working parts of abnormal pressure. There is no damage to the meter other than the breakage of the frost bottom. We also manufacture turbine and compound meters which are described in special Bulletins.

## BADGER METER MFG. CO.

841-847 30th STREET,

MILWAUKEE, WISCONSIN

111 W. WASHINGTON STREET  
CHICAGO, ILL.

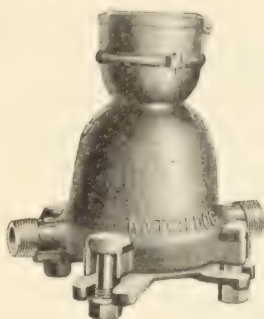
414 INTERSTATE BLDG.  
KANSAS CITY, MO.

32 COURT STREET  
BROOKLYN, N. Y.

1621-39 FIFTEENTH STREET  
DENVER, COLO.



## "WATCH DOG"



## WATER METERS

Accurate  
Durable  
Efficient

**GAMON METER COMPANY**

*Main Office and Works:*  
**NEWARK, NEW JERSEY**

## Cast Iron Pipe and Fittings

"Mathews" (REG. U. S. PAT. OFF.)

**Fire Hydrants**

**Gate Valves**  
**Check and Foot Valves**

**R.D. WOOD & CO.**  
ESTABLISHED 1893  
**PHILADELPHIA, PA.**

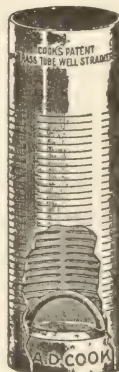


## Electro Bleaching Gas Co.

PIONEER MANUFACTURERS OF LIQUID CHLORINE

*Plant: NIAGARA FALLS, N.Y.*

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Eliminates sand from deep water wells with the

## Cook Patent Brass Tube Well Strainer

Write for Bulletin 80.

**A. D. COOK, Inc.**

*Manufacturer of Deep Well Pumps  
and Strainers*

**Lawrenceburg, Ind.**

## JOHNSON BRASS WELL SCREENS

Have 50% greater capacity than any other. If your well ends in sand or gravel you need one. Insures continuous use.

*Write us*

**Edward E. Johnson, Inc.**  
**St. Paul Minn.**



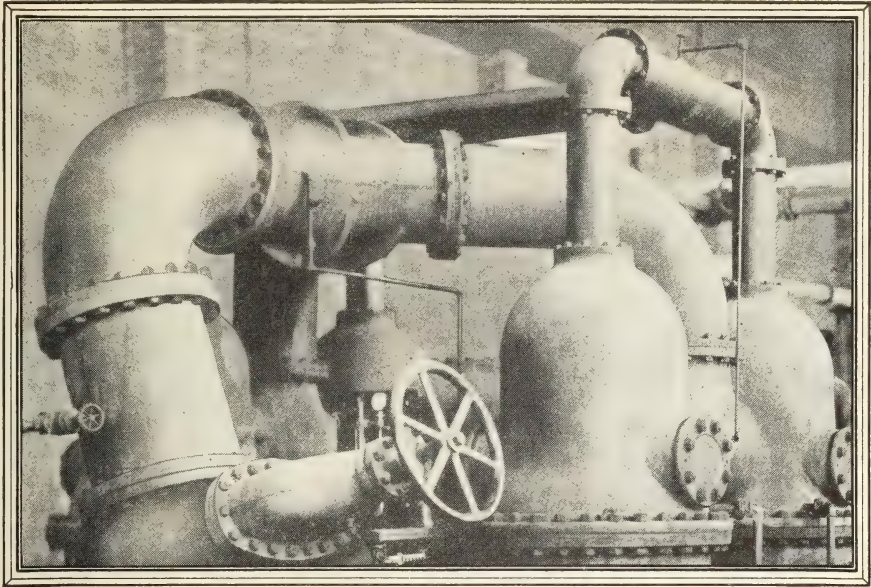
For Water, Sewage, Gas, Air, Steam—  
in fact everything that flows.

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CONDENSER CONNECTIONS, "A" STREET POWER STATION, LINCOLN, NEBR.  
GEO. W. BATES, CITY ENGINEER. FRED W. TYLER, ERECTING ENGINEER

## REDUCING YOUR CONSTRUCTION COSTS

In the erecting of new piping systems or the enlarging of an old piping system, much time and money can be saved by the use of materials accurately made, eliminating costly hand-fitting at the time of erection. Experienced workmen, using the most modern machinery and

methods, produce Crane valves, fittings, pipe bends and allied specialties to precise measurements, to make them easy to assemble. Crane equipment meets every piping need, including the severe requirements imposed by high pressures and excessive temperatures.

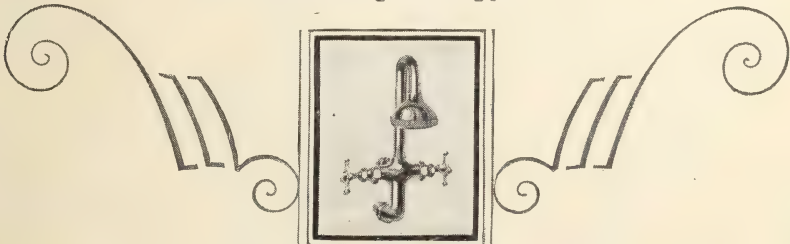
# CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVE., CHICAGO

*Branches and Sales Offices in One Hundred and Thirty-five Cities*

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"Telsa" Wash Sink Faucet



# Fire Hydrants

Smith Fire Hydrants are scientifically constructed by engineers to deliver the greatest volume of water under a given pressure.

Smith Fire Hydrants are designed with easy-flow waterways without detours or obstructions which have a tendency to kill efficiency and retard the flow. This hydrant is built strictly along hydraulic principles to meet the exacting demands of modern fire equipment.

Compare this hydrant with other hydrants under parallel and static conditions, and you will find that the Smith hydrant produces the greatest volume at the nozzle, with low frictional loss.

Easy-operation with positive drip-valve. Built for rugged use. Adopted by cities throughout the country and especially designed for high pressure services.

*Made by the makers of Smith Tapping Machines, Valves, Gate Valves and other water works specialties.*



*The*  
**A.P. Smith**  
**Mfg. Co.**  
East Orange, N.J.



**No oil  
No valves  
No moving  
parts to  
wear out**

A piece of apparatus that works in a sewer flush-tank, underground, must be of trouble-free design and construction to perform its task efficiently.

The Miller Automatic Siphon has no moving parts. Wear is minimized and oiling parts eliminated. It will absolutely empty the flush tank at stated intervals, shooting a volume of clean water down the sewer lines, thus removing sediment and keeping them fresh and clean.

Ask for Catalog No. 22.

2026-P

**PACIFIC FLUSH-TANK CO.**

**SINGER BUILDING, NEW YORK**

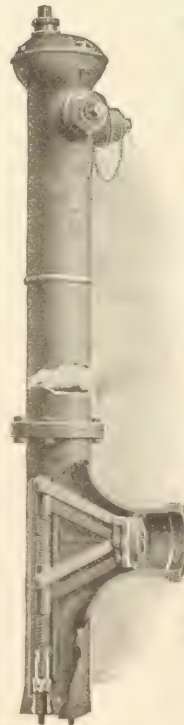
**4241 RAVENSWOOD AVENUE, CHICAGO**

## "COREY" HYDRANTS

Easily operated. The knuckle joint gives easy and positive closing of specially prepared rubber main valve. All interior working parts are made unusually strong and of solid bronze or bronze mounted. The rubber drip valve gives perfect drainage.

Send for Catalog F.  
It is complete.

**RENSSELAER**  
**VALVE COMPANY**  
TROY, N. Y.



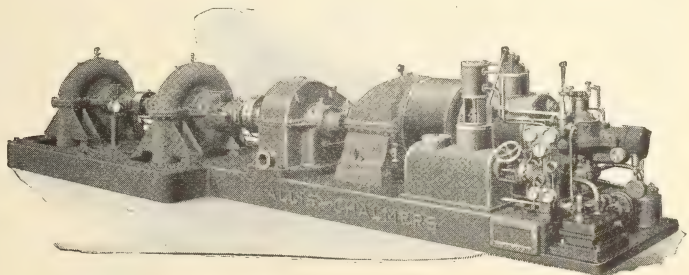


## **“THE ENTIRE INSTALLATION IS SATISFACTORY”**

*(Extract from City's Letter of Acceptance)*

This statement covers the steam turbine, pumps, gear set, condenser and accessory equipment of a 15 million gallon per day geared steam turbine driven pumping unit which has just been officially tested and found to meet the guarantees in every respect. Results of this kind can be expected from Allis-Chalmers complete centrifugal pumping units, the units of undivided responsibility.

Our centrifugal pump bulletin 1632-E describing our efficient pumps for both large and small cities, will be sent on request.



# **ALLIS-CHALMERS**

**MILWAUKEE, WIS. U. S. A.**



## "Destruction not Reduction"

### Garbage and Refuse Incinerators for Municipalities

POSITIVELY NO AUXILIARY FUEL REQUIRED.

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80 N. La Salle Street Chicago, Ill.

We manufacture Manhole, Catch Basin and Sewerage Castings of all kinds. We make anything in Gray Iron. Write for our prices.

## COLUMBIAN IRON WORKS

CHATTANOOGA, TENN.

Manufacturers of Fire Hydrants, Valves, Valve Boxes, Sluice Gates, Meter Boxes and Water Works Supplies

ESTIMATES PROMPTLY FURNISHED

SLUICE GATES, CHECK VALVES, AIR VALVES, INDICATOR POSTS, ETC.

### GATE VALVES

### EDDY

### FIRE HYDRANTS

Hydraulically and Electrically Operated Valves and Sluice Gates Valves Designed For All Kinds of Service.

EDDY VALVE COMPANY, WATERFORD, N. Y.

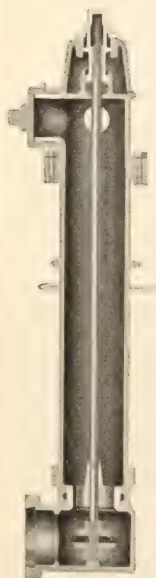
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## WATEROUS FIRE HYDRANTS

STANDARD  
of the  
NORTHWEST

Waterous Fire Hydrants have stood the test of 35 Northern winters.

Positive drain; free waterway; simple design.

All parts removable without digging up hydrant.

**WATEROUS FIRE ENGINE CO.**  
ST. PAUL, MINN.

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Registered U. S. Patent Office

NO CAULKING

For Jointing Cast Iron Water Mains

Saves 50% to 75%

Leadite Joints Improve with Age

**THE LEADITE COMPANY**

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Philadelphia, Pa.



## KENNEDY

**WATER GATES  
HYDRANTS  
VALVES**

THERE ARE 500 TYPES AND SIZES OF KENNEDY VALVES AND THEY ARE FULLY DESCRIBED IN OUR LATEST CATALOG. SEND FOR IT TODAY.

**The Kennedy Valve Mfg. Co.**

BRANCHES: 95 John St., New York; 228 N. Jefferson St., Chicago; 47 India St., Boston; 23-25 Minna St., San Francisco. SALES OFFICES: Salt Lake City, Seattle El Paso.

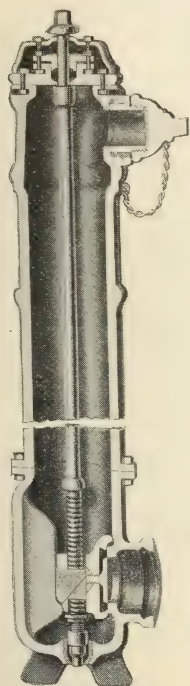
EXPORT OFFICE: Elmira, N. Y.



THE AMERICAN CITY

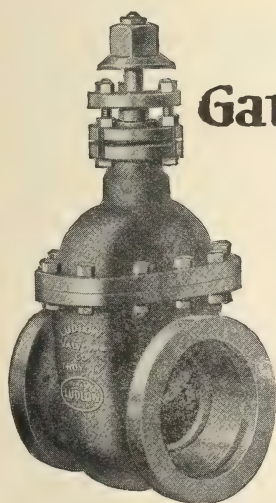
# LUDLOW

TRADE  
LUDLOW  
MARK



## Hydrants:

All working parts of the Ludlow Slide Gate Fire Hydrant can be removed without disturbing the barrel of the hydrant or doing any digging by simply removing the wrench nut, dome and packing plate at the top of the hydrant. Frost cases are unnecessary. Over 97 per cent of the hydrants furnished in the last five years have been sent out without frost cases and none have been subsequently ordered put on. This hydrant has a remarkably free flow of water and because of the method of construction and the extra large diameter of standpipe compared with the size of the valve opening, has an almost unobstructed flow of water.



## Gate Valves:

Ludlow Double Gate Straightway Valves are so constructed that there is no locking or wedging of the gates in closing until they are directly opposite the port or valve opening. In opening the valve the first turn of the stem releases the upper wedge from contact with the lower wedge, thereby instantly releasing both gates or discs from their seats before they commence to rise.

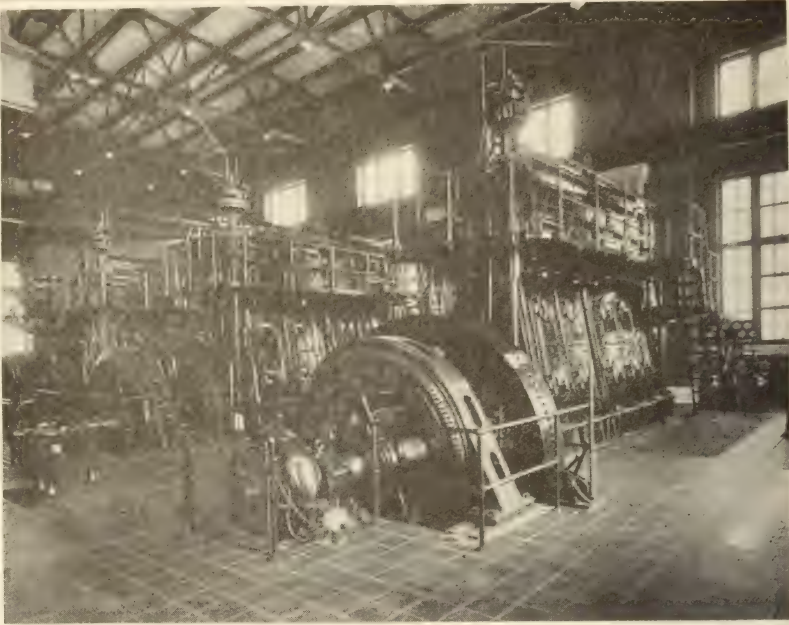
Our latest 208-page cloth-bound catalog of Ludlow Valves and Fire Hydrants will be forwarded to water works officials and engineers free on request.

# *The Ludlow Valve Mfg. Co.*

TROY · N · Y ·

BRANCH OFFICES: NEW YORK · CHICAGO · BOSTON · PHILADELPHIA · PITTSBURG · KANSAS CITY





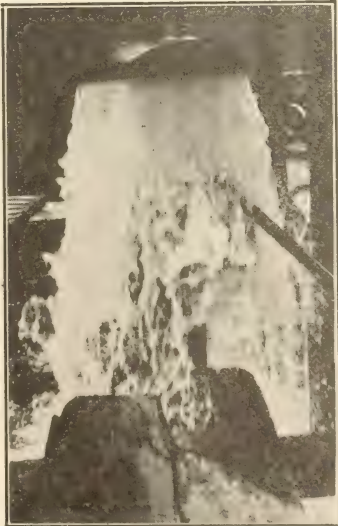
When in Chicago visit this 3000 H.P. Busch-Sulzer Four Unit Plant  
Sanitary District Station at 125th and Indiana Avenue.

## BUSCH-SULZER BROS.-DIESEL ENGINE CO.

New York, 60 Broadway

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993 Gallons per Minute  
Dosch Chemical Company

## SOME SPLASH!

The Dosch Chemical Company of Louisville, Ky., recently installed one of our Indiana ECONOMY Air Lift Pumps in their 10 inch well, 120 feet deep.

With their former Air Lift a maximum of 450 gallons per minute was obtained. With the ECONOMY Pump an actual test showed 993 gallons per minute.

If your well is not delivering what you need, tell us your well conditions and water requirements and let our Engineers make definite recommendations. And with no obligations attached.

Ask for our new catalog.

INDIANA AIR PUMP COMPANY - Indianapolis, Ind.

# DARLING

## FIRE HYDRANTS and GATE VALVES

**F**OR many years Darling has devoted its energies to the development of simplified, yet mechanically perfect Fire Hydrants and Gate Valves for water mains. Specialization has reaped its reward in that these Darling products, wherever used are considered far superior to similar articles on the market.

The Darling Hydrant's internal parts, for instance including main valve and drip valve seats, may be readily removed through the hydrant top. It has a compression drip which cannot clog. A barrel delivers water to nozzles without perceptible loss of pressure. Compression valve closes with the pressure.

The Darling Gate Valve has revolving discs that seat at a different place each time valve is operated, insuring long wear. A wedging mechanism that carries discs over port and in front of seats before spreading. The parallel seats are renewable and have ground-in faces. The largest Darling Gate Valve can be easily operated by one man without artificial aid.

*Catalogues and diagrams on request.*

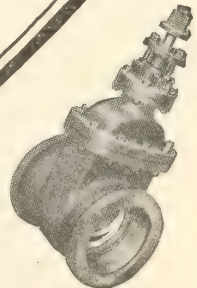
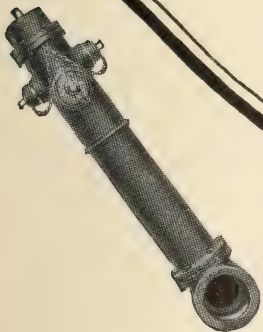
**DARLING VALVE & MFG. COMPANY**  
WILLIAMSPORT, PENNA.

NEW YORK

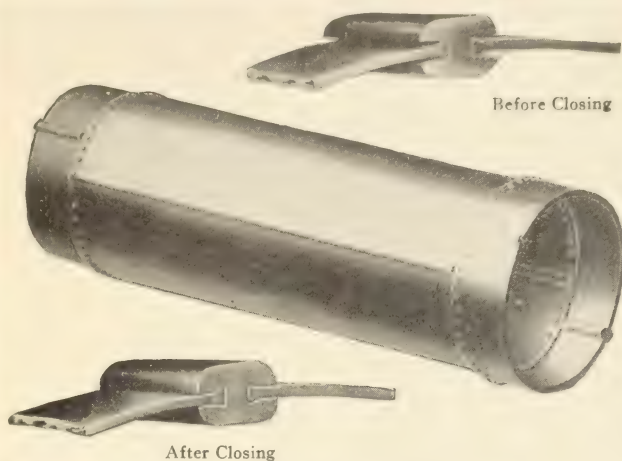
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## Lock Bar Steel Pipe—

**The Only Pipe with the 100% Joint—**

**STRENGTH**—The Lock Bar Joint is as strong as the steel itself.

**CAPACITY**—Will carry 15% more water than riveted pipe because of smooth interior, absence of rivets, and joints 30 feet apart.

**DURABILITY**—Satisfactory service upwards of 70 years.

### EAST JERSEY PIPE COMPANY

7 Dey Street,

New York City

## Boost Your Water Supply

For elevated tanks, Sullivan Boosters enable you to

(1) Pump water horizontally or to an elevation by air power without installing separate pumps or gravity tanks. (2) Use the same compressed air for this work that has already been used to lift water to the surface. (3) Secure effective separation of the air and water, due to the swirling action. (4) The system is entirely automatic. (5) Two or more wells can be operated from the same central air power house. Ask for "air lift" catalogue, 371G.



**SULLIVAN MACHINERY COMPANY**  
125 SO. MICHIGAN AVE., CHICAGO

## FOR PIPE USERS

**TAYLOR'S SPIRAL RIVETED PIPE**

Offers great strength, durability and economy. For high pressure water supply and intake mains and piping for special purposes.

Send for copy of our production book giving full information.

**AMERICAN SPIRAL PIPE WORKS**

P. O. Box 485

CHICAGO, ILL.

The Best Material for **CALKING**  
Joints in Cast Iron Pipes is

## Ulco Lead Wool

IN ROPE FORM

Write for particulars to

**UNITED LEAD COMPANY**

111 BROADWAY, N. Y. CITY

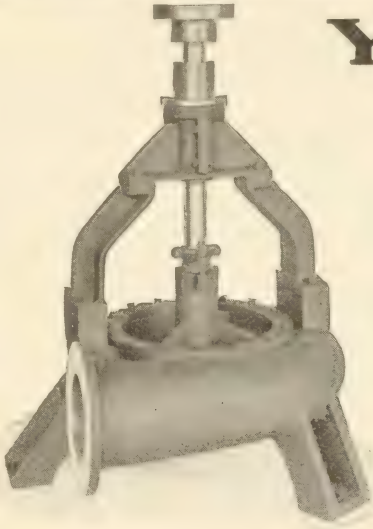


Soon there will be miles  
and miles of such scenes  
as this in Oklahoma

	Tulsa has ordered	
	52½ miles installed	
	of 54-in. and 60-in.	

**LOCK JOINT**  
*Reinforced*  
**Concrete Pipe**





# YEOMANS SEWAGE PUMPS

Yeomans vertical centrifugal suction-type pumps driven by low-speed, direct-connected motors automatically controlled give the maximum reliability and durability for lifting the sewage of low city districts and preventing floods. The heavy casings with large water passages and perfectly balanced open impellers insure non-clogging by heavy sewage.

Leaflet E-20 descriptive of sewage pumps for municipalities, real estate subdivisions, etc., sent free on request.

## Yeomans Brothers Company

1417 DAYTON ST., CHICAGO

Canadian Representatives—Darling Brothers, Limited, Montreal

## ANY ROOTS IN YOUR SEWERS?



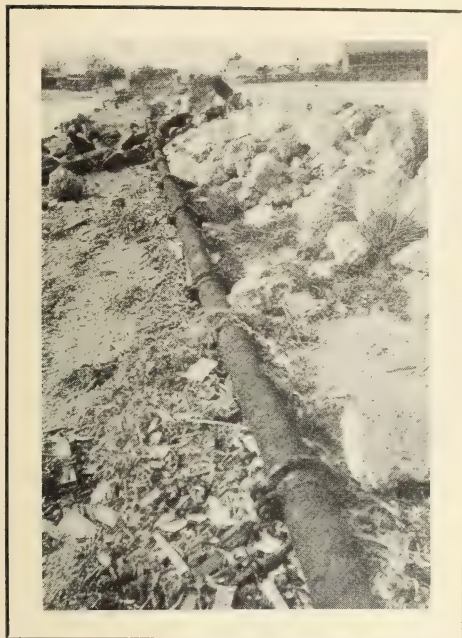
### \$7,000 Saved in One Year in Schenectady

**R**OOTS in the sewers of Schenectady, N. Y., made it necessary to clean out 15,000 feet of sewers. By the use of a Turbine Sewer Cleaning Machine, the cost was about \$2,300, which was a saving of over \$7,000 on the cost if it had been necessary to excavate and replace the sewers which were blocked by root growths. You can learn what Turbine Sewer Cleaning Machines have done in many other cities by sending for our interesting illustrated bulletins which describe the work and show the savings effected.

## THE TURBINE SEWER MACHINE COMPANY

195 - 11th STREET

MILWAUKEE, WIS.



*Thirty miles of Universal Cast Iron Pipe, sizes 2 in. to 12 in., laid by the Key West Gas Company nine years ago is giving perfect satisfaction.*

**UNIVERSAL**  
*the*  
**CAST IRON PIPE**  
that Makes  
its Own Joints

## *Exposure to the Elements*

THE ability of Universal Cast Iron Pipe to give dependable service under unusually severe conditions is universally recognized. Consider the Universal line shown above, recently photographed at Key West where the bank washed away in 1919. Despite repeated attacks

of heavy seas, this 4-in. Universal Pipe line continues to give uninterrupted service.

Universal Pipe is the ideal pipe for water supply, high pressure fire systems, gas lines and other service where freedom from leakage is essential.

# UNIVERSAL CAST IRON PIPE

*no pouring, no calking—tight and flexible; no bell holes*

THE CENTRAL FOUNDRY COMPANY

*Subsidiary of*

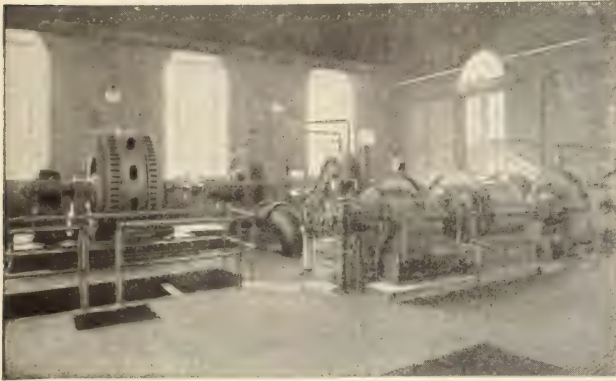
**IRON PRODUCTS CORPORATION**

41 East 42nd Street, New York

Sales Offices: New York, Chicago, Birmingham, Dallas, San Francisco



# De Laval Pumping Units at Hamilton, Ont.



THE City of Hamilton uses hydro-electric power to drive De Laval Centrifugal Pump which supplies the regular water requirements, but also has installed a De Laval Geared Turbine Driven Centrifugal Pump for standby and peak load service. The official tests showed a combined efficiency of 75.98 per cent for the motor and pump unit when delivering 10,028,751 gal. per day against 299.92 ft. head, and for the steam turbine driven pump a duty of 117,000,000 ft. lb. per 100 lb. of dry steam, at 169.7 lbs. gage pressure when delivering 11,110,000 gal. per day against 310.4 ft. head.

*Our engineers will be glad to study your conditions. Ask for Catalog W-64.*

## DE LAVAL STEAM TURBINE CO. TRENTON, NEW JERSEY

LOCAL OFFICES: Atlanta, Birmingham, Boston, Charlotte, Cleveland, Dallas, Denver, Duluth, Indianapolis, Kansas City, Los Angeles, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Toronto, Vancouver

260



## For Pure Water

### **DU PONT** FILTER ALUMS

It is your problem to maintain a constant supply of pure water for your community. And it is a real problem during the spring storms. The swollen streams carry a high percentage of alkali and other waste, which must be eliminated as a safeguard to public health.

For just such conditions du Pont Filter Alums are being used successfully. They will enable you to supply clear, healthful water under the most trying conditions.

Buy du Pont Filter Alums.

**E. I. du Pont de Nemours & Company, Inc.**

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256 Vanderpool St., Newark, N. J.

*Modern Plumbing Codes Demand CAST IRON for ALL House Drainage Piping*

**CAST IRON  
HOUSE DRAINAGE  
FOR SANITATION**

**IN THE  
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UNDER THE  
GROUND**

**USE SOIL PIPE WHERE SOIL PIPE SHOULD  
BE USED**

**SOIL  
WASTE  
VENTS  
LEADERS  
DRAINS  
SEWERS**

**LASTS LONGER  
THAN THE BUILDING**

## ***Protecting the American Home Against the Foulness of the Sewer***

**No corrosion**, no menacing sewer gas, no tearing out of walls and floors, no costly replacements—where cast iron soil pipe is used for soil, waste, vent and leader lines.

**No pollution** of cellars, no stoppage by tree roots, no danger of breakage by jar or settlement, no tearing up of cel-

lar floors and streets, no costly replacements—where cast iron soil pipe is used for house drains and house sewers.

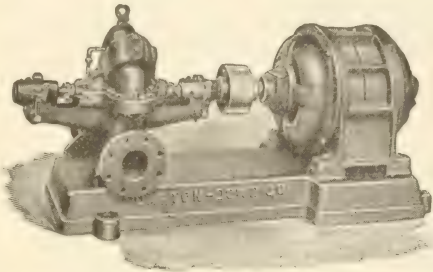
**Progressive municipalities** the country over are insisting upon cast iron soil pipe for all house drainage (in the building and under the ground)—clear out to the main sewer in the street.

*Specifications and illustrated literature will be mailed upon request by any or all of the following independent and competing makers of Cast Iron Soil Pipe and Fittings*

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You can depend on Dayton-Dowd  
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*Catalog on Request.*

**DAYTON-DOWD CO.**  
346 YORK STREET, QUINCY, ILL.

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## DEEP WELL PUMPS

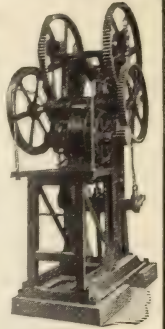
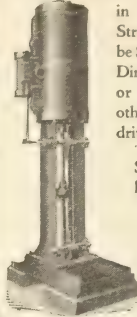
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Security Rods are made from second-  
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couplings swedged or shrunk down  
very tightly on the curved places at  
end of sticks. Security couplings  
*cannot* come off.

Joint and unjoint easily and quickly  
—light weight—long runs easily made.  
No slack but lend themselves to all  
practical bends.

They cannot buckle or uncouple in  
the duct.

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## A DEEP WELL PUMP

OF EXCEPTIONAL MERIT

## "THE POMONA"

**Double Stroke Deep Well  
Power Pump**

**A Size for Every Well**

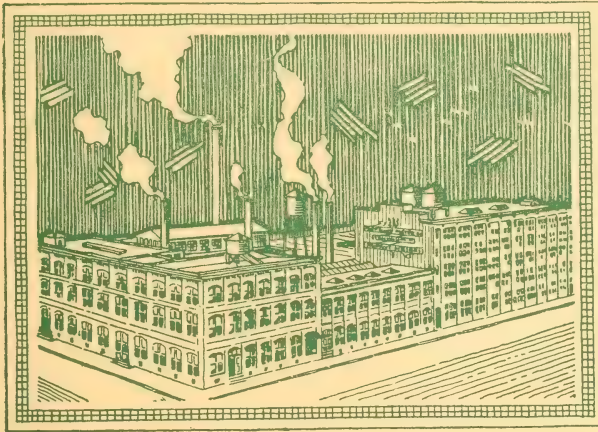
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**UNITED IRON WORKS, Inc.**  
**Kansas City, Mo.**

*Send for catalog if it  
is deep-well pumping*

**"TELL US YOUR TROUBLES"**

# GOOD NEWS



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Made where the spirit of  
Craftsmanship  
dominates  
automatic machinery

### NEPTUNE METER COMPANY

50 EAST 42nd STREET, NEW YORK  
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*Makers of the Trident Water Meter*



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**B**ILL has been all through the Neptune Meter Plant "where the spirit of craftsmanship dominates automatic machinery." He has watched the making of Trident Meters—and in a series of real human letters to friend Jim has put down on paper, in non-technical language, just what he saw. These letters are a real practical education in water meter manufacture.

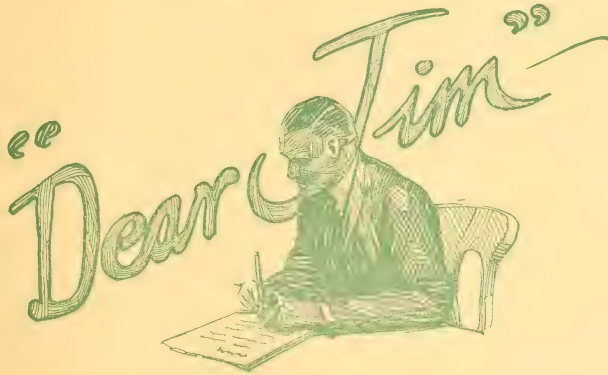
*WATCH FOR THEM*

## NEPTUNE METER COMPANY

50 EAST 42nd STREET, NEW YORK  
CHICAGO • BOSTON • SAN FRANCISCO  
ATLANTA • LOS ANGELES • SEATTLE  
PORTLAND • CINCINNATI

*Makers of the Trident Water Meter*

# METERS



## DID YOU GET THE FIRST LETTER?

I T told the story of the "human element" in manufacturing. If you did not get No. 1 write for a copy. No. 2 will be mailed on February 3 and if it does not reach you within a few days—*let us know*. You will be interested in this inside story of a great industry.

### NEPTUNE METER COMPANY

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Makers of the Trident Water Meter



# TRIDENT

THE METER WITH A  
STORY BEHIND IT



**NEPTUNE METER COMPANY**

50 EAST 42nd STREET, NEW YORK

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*Makers of the Trident Water Meter*

# **South Bend**

*"Studebaker Model"*

## **STREET FLUSHING AND SPRINKLING MACHINES**

THERE ARE MORE "SOUTH BEND" FLUSHERS AND SPRINKLERS  
IN OPERATION THAN ALL OTHER MAKES COMBINED.

### **NEW YORK CITY**

Uses 75 South Bend Flushers purchased three years ago and in reply to an inquiry from a sister city say—*"They have performed in a very satisfactory manner."*

### **PHILADELPHIA**

Purchased 15 South Bend Flushers in 1921 and when adding to their flushing equipment in 1922 they selected more of the same make.

### **CHICAGO**

Buys 10 South Bend Flushers in 1922—They made their selection after 2 years' experience with various makes of flushers—including a South Bend Double Unit.

### **CLEVELAND**

Began using South Bend Flushers in 1918 and have added more of the same flushers each year and now their entire fleet is composed of this make only.

### **DALLAS**

In 1917 this city received its first South Bend Flusher—in 1920 they purchased 3 more and again in 1922 they bought 2 additional—Repeat orders indicate satisfactory service.

THE ABOVE ARE ONLY A FEW OF THE CITIES USING "SOUTH BEND"  
EQUIPMENT—WE WILL SEND YOU A COMPLETE LIST OF USERS UPON REQUEST.

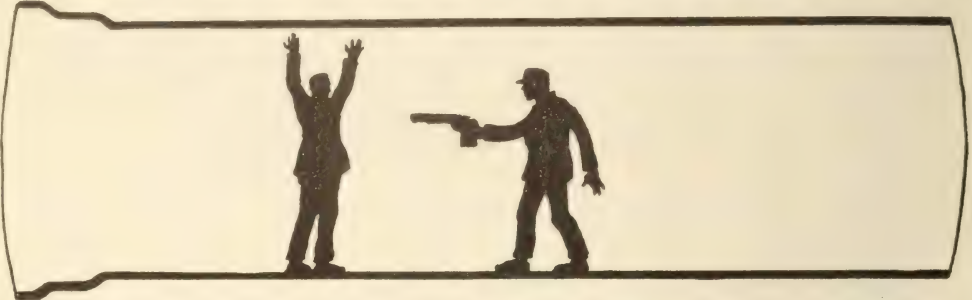
## **MUNICIPAL SUPPLY COMPANY**

**SOUTH BEND, INDIANA, U. S. A.**

Purchasers in Canada supplied by  
**THE BICKLE FIRE ENGINE COMPANY**  
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# A HOLD-UP



## IN YOUR WATER MAINS

Just as the highwayman holds up the unlucky traveler on the road and takes away his money, so do the hundreds of thousands of tuberculations in your water pipes hold up the flow of water and rob the stream of its pressure and the pipe of its capacity. This means a distinct financial loss to the water department, through its inability to deliver water in adequate volume and pressure.

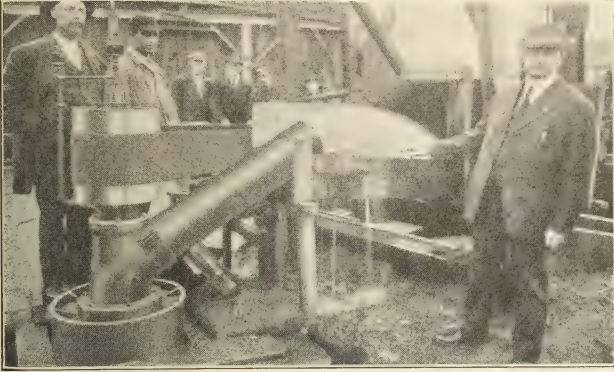
### THE NATIONAL METHOD

of cleaning water mains quickly and economically removes all incrustations and tuberculations and restores the pipe to its original capacity. Send for our booklet completely describing the National Method of cleaning water mains. It records the savings which other cities have made in purchases of pumping equipment and new pipe lines through restoring the capacity of their old water mains by cleaning.

**NATIONAL WATER MAIN CLEANING CO.**

**HUDSON TERMINAL  
BUILDING**

**NEW YORK CITY  
U. S. A.**



## The Screen

Wells constructed with old-style large perforations, sawed, slotted, buttoned, ribbed, gauze or common round wire have their weakest point where they should be the strongest, whereas in the manufacture of "THE LAYNE PATENT KEYSTONE WIRE-WOUND SCREENS" using small perforations set close together, we get much greater screening area and do not weaken the well at this point, but rather strengthen it as the wire is much heavier and of a much higher quality than is commonly used.

## The Pump

Layne Pumps solve the problem of how to get the desired amount of water from a deep well. In installing the Layne pump in a deep well, stages or runners are added to give the necessary impetus to the water in order to lift it to the surface. There are no complicated water balances or valves used and no packing glands below the surface. They are absolutely unaffected by sand or gritty substances and are therefore most desirable for deep well work.

**LAYNE & BOWLER  
COMPANY**

**MEMPHIS,  
TENNESSEE**



EVERWEAR



EVERWEAR

# PLAYGROUND

See the boy half-way down the slide?—Ask that boy's mother what kind of overalls, "pants," shoes and stockings she buys for him.—She will tell you that it is absolutely necessary to buy strong, durable materials that will stand **hard wear**.

Wise "city fathers" will take a leaf from "Mother's" notebook when buying playground equipment. They will invest only in apparatus that is:

## WEAR-PROOF WEATHER-PROOF HARM-PROOF

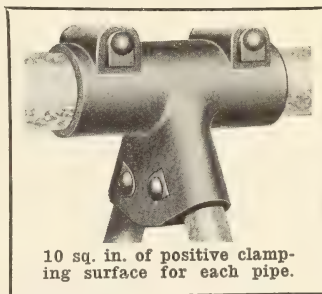
### *Why? Because---*

"Wear-proof" apparatus means **low cost of upkeep**.

"Weather-proof" apparatus means **long-time service**.

"Harm-proof" apparatus means **freedom from accident**  
for our boys and girls!

At the right is shown a typical EVERWEAR fitting. Such a fitting as this not only permits the greatest ease of erection but decidedly increases the safety of the apparatus. No pipe can become loose or insecure. The powerful compression "dogs" are proof against vibration and strain. They "bite" and hold.



This is merely one illustration of the strength of materials and the care in design that are the real, underlying causes of the success—the permanence—the safety—of EVERWEAR apparatus.

**The Everwear Manufacturing Company**  
**SPRINGFIELD OHIO**

# APPARATUS



# ALL STEEL PLAYGROUND APPARATUS

EFFICIENCY  
AND SERVICE

STRENGTH &  
DURABILITY



**THE EUREKA MANUFACTURING CO.**

MANUFACTURERS OF  
**PARK AND PLAYGROUND EQUIPMENT**  
**SANDUSKY, OHIO, U.S.A.**

Successors to

*The Ashland Manufacturing Company*  
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THE BAUSMAN SPECIAL

**E**SPECIALLY designed for Parks, it has struck the keynote of low-cost maintenance and is recognized as the greatest advance in bench designing in many years.

Slats Selected  
Hard Wood.

Frame  
 $1\frac{1}{2} \times \frac{1}{4}$  inch  
Wrought Iron.

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BENCH MAKERS FOR TWENTY-SIX YEARS.

GET OUR CATALOGUE AND PRICES.

# Your Playgrounds

**T**HE youngsters on the streets are future citizens. Your playgrounds should attract them. Fun-Ful playground equipment is what makes the playground, drawing the crowd of youngsters that need the healthful exercise furnished by well-designed, scientifically planned, sturdily-built equipment. Whether it be swings, seesaws, slides or merry-go-rounds, you will find that the city whose playgrounds are properly equipped has Fun-Ful apparatus.

*Illustrated catalog free on request. Largest manufacturers of playground equipment.*

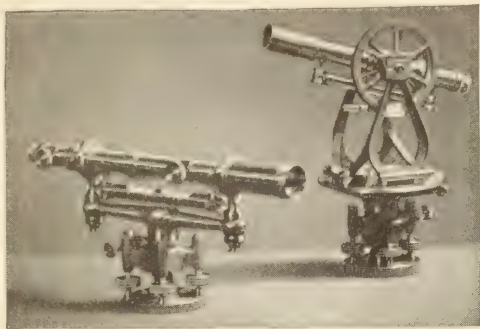
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have thousands of enthusiastic friends among the Engineering Profession. Many of them are your friends, too. Why not talk to them?

*Write for descriptive literature.*

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# GURLEY

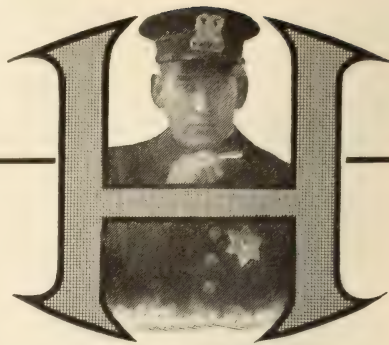
## THIS LITTLE CHAP WILL THANK YOU



for "OVERSIZE" Playground Apparatus. You know what we mean by Oversize — Everything made better than demanded—stronger than usually thought necessary—assuring a satisfaction greater than expected. Oversize means Safety — permanent safety. The little folks have put their trust in us, and we shall continue to justify that confidence. Good enough will not do—it must be Best. Let us work with you on your plans.

**A. G. SPALDING & BROS.**  
CHICOPEE, MASS.

Makers of Playground Apparatus for  
Thirty Years

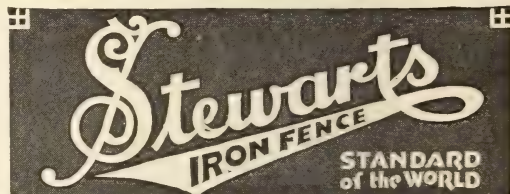


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Comfortable, airy bedrooms. Luxurious lobbies with spacious verandas and sun parlors overlooking the ocean. Hot and cold running sea water in all baths. An ideal sojourn for those seeking rest recreation. Afternoon musicales and teas, with evening concert features. Dancing.

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JOEL HILLMAN, Proprietor

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A municipality having well-lighted streets is peaceful because it is protected.

Mayors, City Engineers, Street Lighting Superintendents and others interested, are invited to write for our booklet and to communicate with us on any street lighting requirements.

## Welsbach Street Lighting Co.

of America

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**Kansas City, Mo.**

*protects corners*


with

**MUSHROOM  
TRAFFIC  
LIGHTS**

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**Flag  
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**The ONLY  
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66' Taper Welded Pole,  
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**A  
Fire  
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Can  
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200  
Lives  
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Minute**

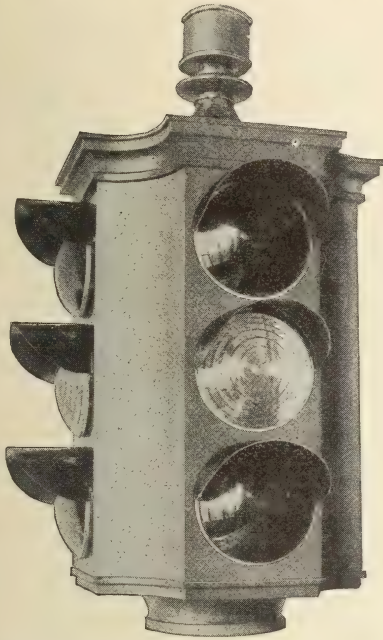
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**THE  
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*Incorporated*

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(Stop and Go)



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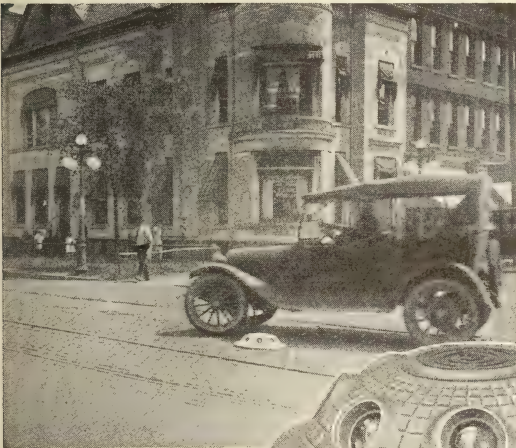
*"A Signal for EVERY Condition."*

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**WIRES & CABLES**

HAZARD PARKWAY  
Cables for dependable  
service in street-lighting.

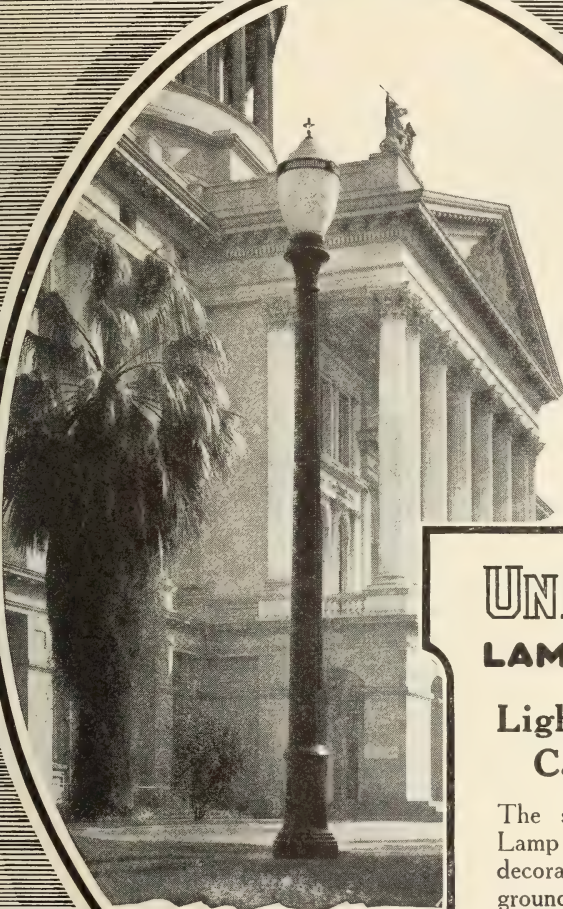
HAZARD SPIRAL-  
WEAVE Tree Wire is a  
long-wearing and service-  
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*The*  
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serves every purpose  
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National Electrical Code Standard



*Complete detail specifications for your files upon request.  
Ask for Simcore Specifications No. 2053.*

### SIMPLEX WIRE & CABLE CO

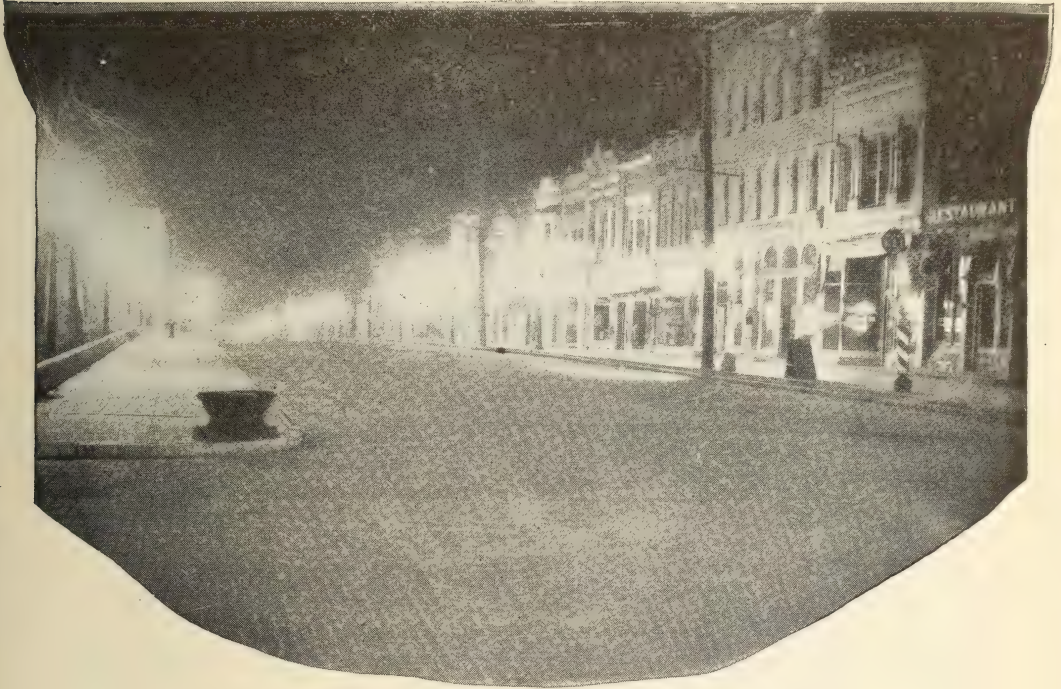
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#### **G-E Novalux Units**

The advantages of good street lighting are too well known to need mention. The beauty of ornamental units by day is emphasized at night when the glowing globes bring daylight safety to the hours of darkness.

G-E street lighting specialists are particularly well qualified to give impartial advice on the proper street lighting system for any city, as the General Electric Company is in a position to furnish any kind of system chosen, all the way from generators to lamps. Address our nearest office for advisory service.

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## Whatever else may fail

Linking city, village and farm, crossing mountain and wilderness, the telephone system challenges Nature in her strongholds and battles her fiercest moods.

Out on his lonely "beat" the telephone trouble-hunter braves the blizzard on snow-shoes, body bent against the wind, but eyes intent upon the wires.

North, south, east, west—in winter and summer, in forest and desert—the telephone workers guard the highways of communication. Traveling afoot where there are no roads, crawling sometimes on hands and knees, riding on burros, or motor-

cycles, or trucks, they "get there" as they can.

When Nature rages to that point where few things can stand against her, when property is destroyed and towns cut off, the telephone is needed more than ever. No cost is too much, no sacrifice too great, to keep the wires open. If telephone poles come down with the storm, no matter how distant they may be, no matter how difficult to reach, somehow a way is found, somehow—in blizzard, hurricane, or flood—the service is restored.

Whatever else may fail, the telephone service must not fail, if human effort can prevent it. This is the spirit of the Bell System.

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AMERICAN TELEPHONE AND TELEGRAPH COMPANY  
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*Ancient and Modern*

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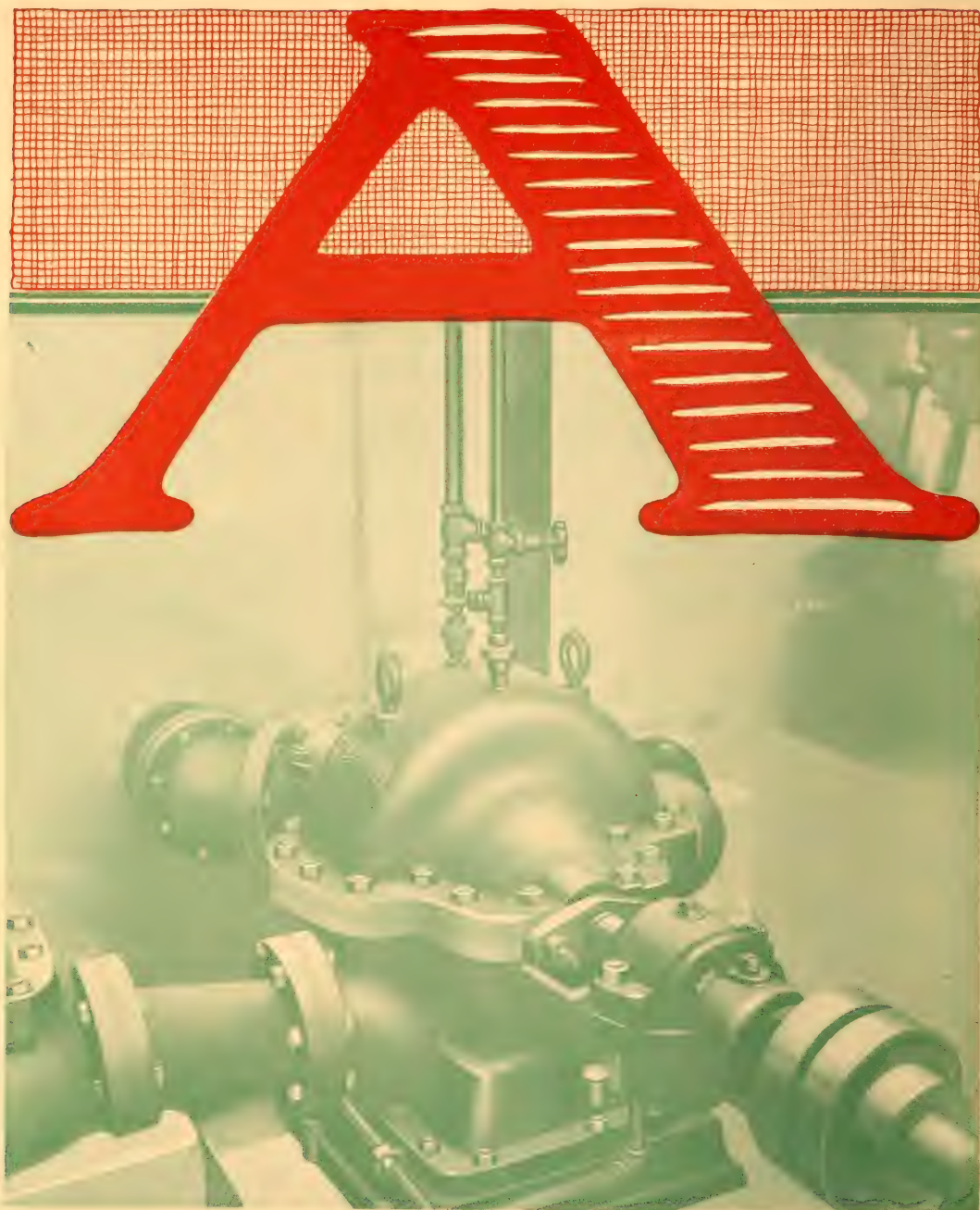
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## "You May Refer Them to Us"

One of the best indications of the service "American" pumps give is the willingness of the users to recommend them to others!

To the left is illustrated an "American" 4-inch SIMD Centrifugal Pump which has recently been installed by the city of Roundup, Montana. This pump is driven by a 75 H.P. motor at 1750 R.P.M. and is designed to deliver 600 G.P.M. against a 280-ft. head.

Mr. Fred Quinnell, Commissioner of Public Works of Roundup, writes: "The little pump is working splendidly and if you have any prospective sales in this vicinity at any time, you may refer them to us."

"American" engineers, long experienced in municipal works, will gladly advise with you.

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Jacksonville, Florida  
Charleston, S. C.  
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Denver, Colo.  
Kansas City, Mo.  
Joplin, Mo.  
St. Louis, Mo.  
Dallas, Texas  
Almyra, Ark.

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Montreal, Canada  
Calgary, Alta., Canada  
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# PUMPS



# PENNSYLVANIA

Quality  
LAWN MOWERS



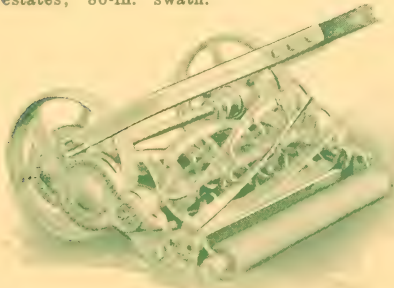
Five Pennsylvania Quality Mowers driven by tractor will cut 60 to 80 acres per day.

The worth of a lawn mower is best judged by performance multiplied by years of service.

Pennsylvania Quality Mowers, whether drawn by horse, driven by tractor and pushed by hand, have given the utmost in service and proved to be longest lived.

Their economy is marked, not only in the amount of work accomplished, but in upkeep as well. This is especially important where large areas must be kept in fine condition.

Pennsylvania TRIO; a time and labor saver for golf course, polo grounds, parks, large estates; 86-in. swath.

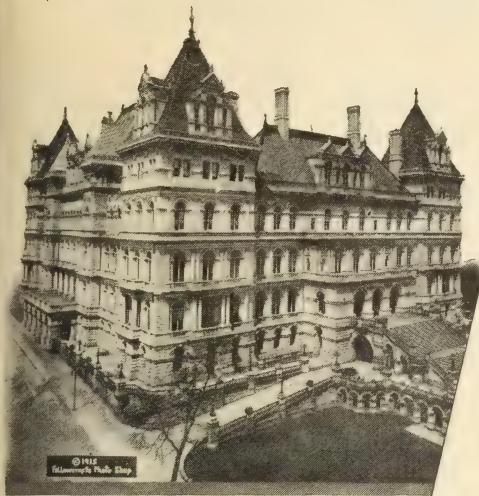


Pennsylvania GOLF; closest cutting for putting greens, tennis courts and fine lawns.

*Write for  
"Pennsylvania TRIO Book"*

**Pennsylvania Lawn Mower Works, Inc.**

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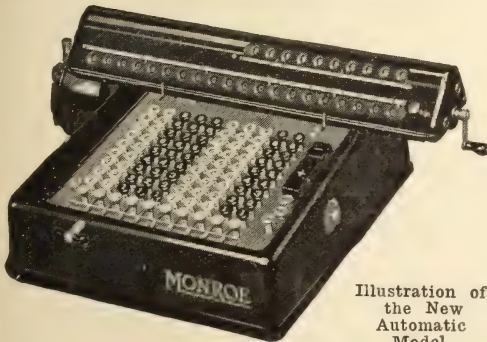
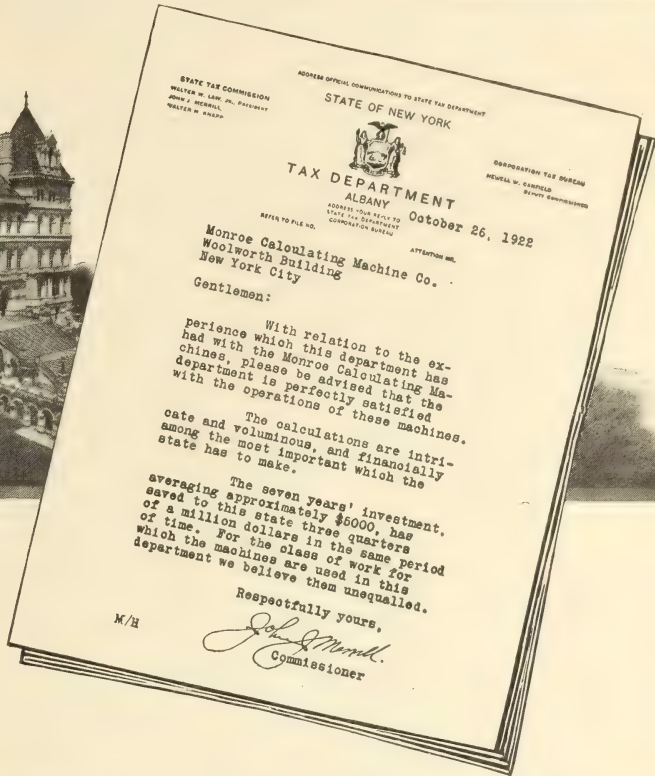


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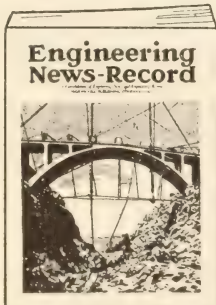
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# The American City Magazine

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# White Trucks

Volume

XXVIII

Number 2

# The American City Magazine

New York

February

1923

## Art and Ideals in War Memorials

FROM chamber of commerce secretaries, the American City Bureau has been receiving during the last six weeks reports of the war memorial movement in 389 of the 746 cities in the United States having a population of 10,000 or more. Reports have also been received from 10 Canadian cities of corresponding size, and from 98 cities of less than 10,000 population.

Of the 497 cities from which responses have come, 144 have memorials completed or under way, 150 have projects under consideration, and 203 report that no action has been taken. The types of memorials erected or proposed are shown by the following tabulation:

Type of Memorial	Completed or Under Construction	Proposed
Memorial Buildings.....	51	58
Parks .....	14	7
Monuments and Statues....	26	7
Trees .....	8	..
Bridges .....	5	3
Tablets .....	28	6
Miscellaneous .....	12	8

Memorials under consideration—type not determined—61.

No action taken—203.

In September, 1918,—several weeks before the armistice was signed,—THE AMERICAN CITY Magazine suggested that memorials of the World War might well take the form of structures which would help the living while commemorating the dead. More than four years have elapsed since the armistice—years of unsettled conditions, industrial and financial. But though many ambitious plans have had to be abandoned or postponed, the progress already made has disclosed much higher standards of artistic taste and civic ideals than characterized previous post-war periods. If the ghost of a certain foreign guest of former days were to

revisit America and inspect our memorials of the World War, he could hardly say of them, as he did of the Civil War memorials, "Now I know what you Americans mean by the horrors of war."

It is significant that of the memorials completed, under construction or proposed, a larger number take the form of buildings than of any other type. Of these memorial buildings, the kind of structure, the cost, and the method of financing in each case are listed on the next page.

Said the late Franklin K. Lane in a letter written to the mayors of American cities in 1919:

"The war has shown, in the camps and camp cities, the great value of adequate facilities for fellowship and public recreation. Now that the men are returning home, they should have the opportunity through the coming years to perpetuate the democracy of the camps and to share with their fellow townsmen, in a suitable building, facilities for discussion of local and national problems and for community singing, drama, indoor athletics and other forms of wholesome recreation."

In many cities where the consideration of memorial projects has been postponed, the recent recovery from the business depression of the last two years will make possible the reconsideration of the subject during 1923. In such communities, THE AMERICAN CITY believes that the most effective appeal that civic leaders can make for an adequate and artistic memorial is the appeal to commemorate, not the victory over a prostrate foe, but the idealism with which the American forces were inspired during the World War and on the ultimate realization of which depends the hope of a just and lasting peace between the nations of the world.



## MEMORIAL BUILDINGS OF THE WORLD WAR

(COMPLETED OR UNDER CONSTRUCTION)

City and Type of Building	Cost	How Financed*
Alpena, Mich.—Memorial Hall.....	\$150,000	P.&S.
Amarillo, Tex.—Municipal Auditorium....	260,000	P.
Atchison, Kans.—Convention Hall.....	200,000	P.
Bakersfield, Calif.—American Legion Home	30,000	S.
Battlesville, Okla.—Hospital.....	200,000	P.
Belleville, Ont.—Memorial Hall.....	25,000	P.&S.
Binghamton, N. Y.—American Legion Home	100,000	S.
Brunswick, Ga.—School.....	175,000	P.
Butler, Pa.—Hospital.....	500,000	
Carthage, Mo.—Memorial Hall.....	150,000	S.
Chatham, Ont.—Wing to General Hospital.	105,000	P.&S.
Chattanooga, Tenn.—Auditorium.....	1,000,000	P.
Claremont, N. H.—Wing to Hospital.....	75,000	S.
El Dorado, Kans.—Auditorium and Legion Quarters.....		P.
Endicott, N. Y.—American Legion Building		
Fort Smith, Ark.—American Legion Home.	20,000	S.
Gloucester, Mass.—American Legion Home.		
Houquiam, Wash.—Office and Lodge Building	150,000	S.
Idabel, Okla.—American Legion Building..	10,000	S.
Independence, Kans.—Convention Hall....	280,000	
Jamestown, N. Y.—American Legion Build- ing.....		
Kankakee, Ill.—K. of C. Club House.....	150,000	P.
Kansas City, Kans.—Auditorium.....	500,000	
Kansas City, Mo.—Memorial Buildings and Shaft.....	2,000,000	S.
Kewanee, Ill.—American Legion Building..	25,000	S.
Kingsburg, Calif.—American Legion Home	20,000	P.&S.
Lemoore, Calif.—American Legion Home..	20,000	P.&S.
London, Ont.—Children's Hospital.....	280,000	P.&S.
Lowell, Mass.—Auditorium.....	1,000,000	P.
Macon, Ga.—Municipal Auditorium.....	600,000	P.
Manhattan, Kans.—Community House....	40,000	P.
Middletown, Ohio—Community Building..	300,000	S.
Natchez, Miss.—Community Hall (Rebuilt)	10,000	S.
Olympia, Wash.—American Legion Auditor- ium.....	40,000	S.
Pomona, Calif.—Y. M. C. A. Building....	305,000	S.
Richmond, Calif.—Memorial Building.....	100,000	P.
St. Maries, Idaho—Memorial Hall.....	20,000	P.&S.
Salina, Kans.—Auditorium.....	300,000	P.
San Bernardino, Calif.—Municipal Audi- torium.....	225,000	
Saratoga Springs, N. Y.—Memorial Building	26,000	S.
South Manchester, Conn.—Hospital.....	195,000	S.
Stockton, Calif.—Auditorium.....	600,000	P.
Sunbury, Pa.—American Legion Home.....		
Thomasville, Ga.—Addition to Hospital....	10,000	S.
Vancouver, Wash.—American Legion Build- ing.....	70,000	S.
Virginia, Minn.—Memorial Building.....	400,000	S.
Waukegan, Ill.—Hospital.....	300,000	S.
Weston, W. Va.—Library Legion Home and Community Center.....	50,000	S.
West Palm Beach, Fla.—Library.....	30,000	P.
Whiting, Ind.—Community House.....	650,000	S.
Wilkes-Barre, Pa.—American Legion Home		

\* P.—Public Funds; S.—Private Subscriptions; P.&S.—Combination of both methods.

(PROPOSED)

City and Type	How Financed*
Abilene, Tex.—American Legion Hall	
Alexandria, La.—Municipal Auditorium	
Ashland, Wis.—Auditorium	
Attleboro, Mass.—City Hall and Auditorium	
Aurora, Ill.—Memorial Building	
Bridgeport, Conn.—Veterans' Club House	
Burlington, N. J.—Memorial Hall	
Butte, Mont.—Auditorium	
Carlisle, Pa.—Community Building	
Cincinnati, Ohio—Veterans' Building	
Clarksburg, W. Va.—Community Building	
Coffeyville, Kans.—Memorial Building	
Columbus, Ga.—Auditorium	
Corning, N. Y.—Community House	
Corry, Pa.—American Legion Rooms	
Council Bluffs, Iowa—Comfort Club and American Legion Home	
Crawfordsville, Ind.—Hospital	
Elizabeth, N. J.—City Hall	
Fort Wayne, Ind.—Coliseum	
Gardner, Mass.—City Hall	
Greenwich, Conn.—High School	
Hannibal, Mo.—Assembly Hall	
Hemet, Calif.—Club House	
Hudson, N. Y.—Community Building	
Huron, S. Dak.—City Auditorium	
Indianapolis, Ind.—National Headquarters of American Legion	
Iowa City, Iowa—Student Club and Social Center	
Jackson, Tenn.—Auditorium	
Joplin, Mo.—Convention Hall	
Kalamazoo, Mich.—Veterans' Home	
Kearney, Nebr.—Municipal Auditorium	
Kenton, Ohio—American Legion Club House	
Key West, Fla.—Community Building	
Lima, Ohio—City Hospital	
Long Beach, Calif.—Auditorium	
Louisville, Ky.—Auditorium	
Madison, Wis.—Auditorium	
Marshalltown, Iowa—Memorial Building	
Marysville, Calif.—Auditorium	
Maryville, Tenn.—Hotel	
McKeesport, Pa.—Memorial Hall	
Norfolk, Va.—Municipal Auditorium	
Oelwein, Iowa—Community Building	
Pensacola, Fla.—Memorial Building	
Plymouth, Mass.—Memorial Hall	
Quincy, Mass.—Armory	
Racine, Wis.—Memorial Building	
St. Marys, Pa.—Community Building	
Salem, Ohio—Community Building	
Sandpoint, Idaho—Community Hall	
Sault Ste. Marie, Mich.—Hospital	
Steubenville, Ohio—Memorial Building	
Suffolk, Va.—Library	
Tampa, Fla.—Memorial Building	
Traverse City, Mich.—Memorial Hall	
Trenton, N. J.—Assembly Hall	
Wakefield, Mass.—Memorial Building	
Warren, Ohio—Community Building	

Many lovers of nature have advocated parks and trees as living memorials of the great conflict. This suggestion has taken definite form among the cities reporting, as follows:

## PARKS

COMPLETED OR UNDER

CONSTRUCTION

Baton Rouge, La.	Orange, Mass.
Bemidji, Minn.	Texarkana, Tex.
El Paso, Tex.	Webb City, Mo.
El Reno, Okla.	
Fulton, Mo.	PROPOSED
Hayward, Calif.	Amsterdam, N. Y.
Hollister, Calif.	Blue Island, Ill.
Leavenworth, Kans.	Conneaut, Ohio
Michigan City, Ind.	Great Barrington, Mass.
Muskogee, Okla.	Hornell, N. Y.
New Castle, Ind.	Newark, Ohio
	Uvalde, Tex.

## TREES

Coshocton, Ohio.....	One mile of trees planted at entrance to city.
Findlay, Ohio.....	One tree planted for each dead soldier.
Grand Haven, Mich....	29 red oak trees planted in park, one for each dead soldier from Ottawa County.
Hartford, Conn.....	One tree planted in park for every person who died in service.
Minneapolis, Minn....	Drive bordered by elm trees, each one dedicated to a dead soldier.
Ogden, Utah.....	Trees planted on memorial driveway.
Pontiac, Mich.....	Trees planted on twenty-five-mile memorial highway, one tree dedicated to each dead soldier from the county.
Tulsa, Okla.....	White elm trees planted on memorial driveway in honor of every man from the state who died in service.

# Should a City Contract for Public Improvements or Do the Work with City Labor?

By Edward A. Beck  
City Manager, Lynchburg, Va.

"**M**ORE business in government" is a slogan that all of us have heard in some form, at some time in some local, state or national campaign. Yet many staunch supporters of this slogan hesitate when governmental business policies lead beyond the paths beaten by customary practise. Each city regards any change from its established routine as an experiment, even though like departures have met with unqualified success in numerous other municipalities.

Municipal shops for the repair of equipment used in the daily performance of certain public functions are common, but there remain cities where the propriety of such an undertaking is being gravely debated. A few municipalities still cling to the practise of contracting for minor additions to their water systems, even though their own

organizations are equally, if not more, competent to perform such work, than is the average contractor. While most municipalities have recognized the advantage of abandoning the contract system for the construction of the ordinary improvements connected with their utilities, there are few, if any, which do not question the advisability of a like policy for other public works

such as sewer installation, street paving and the numerous other betterments commonly handled by contractors.

It is suggested that it is unfair for the city to compete with private business and deprive taxable enterprises from profits accruing from public

improvements. As a matter of fact, there is no competition, although a potential source of profit is removed. On the other hand, it is manifestly unfair to the taxable citizenship as a whole to give a selected few an opportunity for profit denied to others, which must be paid in the tax bills of many.

Again, it was said that the building of public improvements by municipal forces would lack the incentive for prompt and energetic execution of work characteristic of the successful contractor, and thus result in much public inconvenience due to pro-

longation of the construction period. This, of course, is an accusation of governmental inefficiency, which, if true, is equally applicable to every public function. If the argument were founded on fact, then it would seem that sound business policy would demand a discontinuance of those municipal operations which have almost universally been accepted as a proper sphere

## A Few of the Questions Answered in This Article

Does it pay to abandon the contract system for the construction of the ordinary improvements connected with municipal utilities, such as sewer installations and street paving?

Is it unfair for a city to compete with private business and deprive taxable enterprises of profits accruing from public improvements?

Does the building of public improvements by municipal forces lack the incentive for prompt and energetic execution of work characteristic of the successful contractor?

Is work done by the city more costly than when performed by private agencies organized and equipped for that purpose?

What are the relative advantages and disadvantages of municipal construction?

Can a city department effectively handle work of considerable magnitude for street and sewer departments?

Who loses, the city or the contractor, when prices drop after work has started? When prices increase after work has started?



of governmental activity. Street sweeping and refuse collection are examples of services which can be performed under contract, but are now rarely handled in that manner.

Probably the most plausible argument against the policy under discussion is that work so handled would be more costly than when performed by private agencies organized and equipped for that purpose. This argument is supported by the experience of a number of cities where emergency improvements have been undertaken by their own forces without adequate organization or necessary equipment. As a matter of fact, organization and equipment, plus financing, are controlling factors in the success of any enterprise. There is no good reason why a city cannot secure both an organization and an equipment equal to that of any contractor. Certainly most cities have an advantage over the average municipal contractor when it comes to ability to finance any operations they undertake.

Careful consideration of this argument develops the conclusion not alone that it is fallacious, but that on the contrary a city has at least the potential ability to construct public works at an expense, not only less than would be required under the contract system, but even less than the contractor's actual cost.

In support of this statement let me offer the following facts, which I believe are beyond dispute:

1. Both a city and a contractor have the same field from which to recruit an organization.
2. Both have the same markets from which to procure equipment.

In these two respects neither has an advantage.

Now as to materials entering into the actual improvement. While both parties have available the same markets, the city has certain definite and substantial advantages:

1. Its credit is established, which insures prompt deliveries.
2. Its financial resources are sufficient to enable it to take advantage of cash discounts, whereas the average contractor pays his bills on receipt of monthly estimates from the city. Last year Lynchburg benefited over \$2,500 from cash discounts on material purchased for its public improvements.
3. With their credit beyond question, cities can purchase various materials at a lower gross cost than the average contractor.
4. Freight rates favor direct deliveries to

municipalities on certain classes of road-making material. In Virginia, a reduction of 10 cents per ton is allowed from the regular rates on shipments originating within the state. On last year's construction, Lynchburg received a credit from this source of exactly \$617.70.

Other similar savings might also be mentioned. Although the amounts are comparatively small in each instance, yet the aggregate is large.

In the matter of operating expense, the city likewise has many advantages which make it possible to carry on construction at costs below those of a contractor:

1. In that it is necessary to maintain general city accounting and purchasing organizations, the municipal construction department need not carry a charge for these essential operations, which a contractor must enter against his improvement costs. It is true that these departments cost the city money, but in the case of Lynchburg, at least, the expense is practically the same, regardless of whether or not it handles its own work.

2. The activities of a municipality are so diversified that its organization can be continuously employed without encountering an item of expense, as does the contractor, who must maintain at least a skeleton organization in idleness when jobs are not at hand.

3. Lynchburg operates a shop for the maintenance of all its equipment. In this, there is not only a saving in the actual cost of work below that which a contractor would pay if he patronized a commercial shop, as many do, but there is even a greater return through controlling the shop routine so that no time is lost by idle equipment waiting its turn before repairs can be started.

4. The city saves the costs of bonds which are customarily required of the contractor and which he must charge against the work.

While these advantages relate only to actual improvement costs, the city reaps also a direct financial return when it does its own work through eliminating a substantial portion of inspection expense required under the contract system.

Theoretically, there is no doubt that it is economy for a municipality to construct its own improvements, but it has been my experience that work of any magnitude cannot be effectively and efficiently handled by the so-called street and sewer departments under their usual plan of operation in most cities. These departments are ordinarily established with maintenance alone in mind. Attempts at a combination of construction and maintenance in one organization generally result in more expensive construction than when the work is handled by a crew especially organized for that purpose.

Incidentally, it might be remarked that it also happens under these conditions that maintenance is treated as a secondary consideration, leading to neglect of that important service. More expensive construction costs and less effective results logically follow the transfer of labor to construction for short periods after it has become accustomed to working in the loosely organized groups common to maintenance or patch work. Such labor is ordinarily selected for work of that character. On the other hand, maintenance suffers from natural attempts to concentrate large amounts of labor on construction work, which deplete the regular crews beyond the number necessary to carry on routine repairs and patching. This work must be more or less a continuous operation to secure results.

#### Handling Construction in Lynchburg

Following this conclusion, Lynchburg established a Department of Public Works essentially to assume jurisdiction over all public improvements, and in this department is now operated a Bureau of Construction for the sole purpose of building streets and sewers with its own equipment and men.

In January, 1921, prior to the creation of the Construction Bureau, bids were secured on alternate types of paving in connection with the improvement of one of the city streets. These bids were rejected because of excessive cost, and the work was readvertised under specifications limiting the improvement to an asphalt-filled vertical-fiber brick surface on a 5-inch concrete base. As a result, somewhat lower figures were obtained. However, the low bid of \$64,372 was \$12,182 in excess of the city's estimate of the cost of the work if done by municipal forces. The Bureau of Construction was then organized and authorized to proceed with the improvement, which was completed at an expense of \$45,208.23, a net saving of \$19,163.77, or more than 42 per cent of the cost. Were a value placed on "extras" for which a contractor would have been entitled to compensation, and were there eliminated certain items of expense occasioned by keeping the street open almost continuously to traffic—a convenience not ordinarily provided by contract work—the saving would have been appreciably greater.

Good management on the part of the Construction Bureau was not responsible

for all of this saving, however, as a small percentage was due to some decline in the labor and material market which took place after the commencement of the work; but had the improvement been awarded to contract, the contractor, and not the city, would have been the beneficiary of these declines. This suggests a question: If prices had substantially increased, would not the city have been the loser? The answer is "No," for the reason that it is customary for vendors of material to guarantee against a rising market quotations furnished by them for a particular job. Be that as it may, comparative costs for subsequent work under stable market conditions show an equally satisfactory return.

Construction by municipal forces returns economies in sewer installation to an even greater extent than in paving construction. It is obvious that the uncertainties connected with the former call for a greater margin to the contractor in estimating costs.

Even disregarding the saving in cost, it has been Lynchburg's experience that municipal construction of improvements would be justified by other considerations:

1. The city has direct control of the improvement, whereby it is possible to arrange the work with due regard to public convenience, to which a contractor ordinarily gives little, if any, consideration.

2. The city can harmonize all types of construction, such as sewers, gas lines, and water installation, which may not be and usually are not a part of a general contract.

While this discussion has been largely general in its application, yet it must be understood that certain fundamental conditions within the control of each municipality are essential for successful operation:

1. There must be adopted a program of sufficient magnitude to insure continuous operation of the construction organization. The reasons for this are obvious. In the city of Lynchburg sidewalk improvements are largely dependent upon the wishes of individual property owners, who contribute a substantial portion of the cost by agreement; the city has no control over the amount, nor can it time the periods for such construction. The expense of maintaining an organization for that purpose, when it can be engaged only at infrequent intervals, does not result in economy. Therefore, sidewalk construction is not included in the activities of the Municipal Construction Bureau.

2. Ample authority must be provided to insure prompt action in all matters affecting the prosecution of the work, particularly in questions of rates of wages, and the purchase of supplies and materials.



# The Municipal Paving Plant of Palo Alto

By J. F. Byxbee

City Engineer, Palo Alto, Calif.

IN May, 1916, the city of Palo Alto, Calif., received bids on some 1,300,000 square feet of 5-inch concrete pavement. The lowest regular bidder proposed to do the work at the very favorable figure of 10.65 cents per square foot for grading and paving, and an award of contract was made to this bidder. It appears, however, that there was an irregular bid received which was slightly lower, and the contractor who submitted the proposal objected strenuously to the decision of the Council in awarding the contract to the lowest regular bidder. The matter was taken into the courts and fought out on various points for over a year and a half. The courts sustained the city in all points, but by the time the decision was rendered, the conflict in Europe was on and prices for labor and materials had risen to such a point that it was impossible for the contractor to proceed, so the work was abandoned.

In 1918 bids were again received on this work, but were rejected as being too high. If award had been made at this time, the work would have cost the property owners some \$125,000 more than it would have under the 1916 bid. This was a sore point with the city officials, and they were thoroughly disgusted with the methods employed by contractors to interfere with each other's bids.

The last bidding was in March, 1921, when the city advertised to lay 875,549 square feet of asphaltic and hydraulic cement concrete pavements. The bids received for this work were carefully reviewed by the Board of Public Works and the City Council but were finally rejected as too high, and the City Engineer was ordered to report on the installation of a paving plant and to suggest a method by which the work might be financed and carried on.

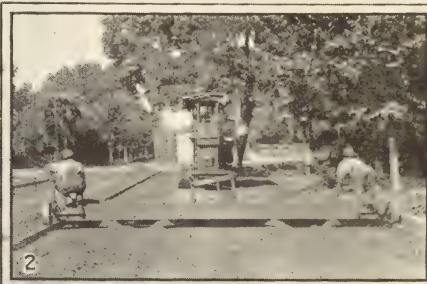
## Portland Cement Concrete Adopted

Portland cement concrete was adopted as

the type of pavement to be laid, because it was believed to be somewhat superior to the asphaltic types and also less costly to maintain. Moreover, the asphalt paving plant is more costly to construct than a concrete mixing plant, a fact which further favored the selection of the concrete type of pavement.

The plan adopted for carrying on the work was by private contract between the Board of Public Works and the property owners. The front-foot method of assessment was used, and the payment for the work was to be made in advance of the actual paving. A city of the size of Palo Alto is unable to finance street work on a large scale, so the payment-in-advance plan seemed to be the only practical solution of the problem. The district plan of assessment cannot be used successfully under this system of financing, but probably will be adopted later in certain instances when the cash reserve of the city is larger than at present and can be drawn on temporarily until payments come in.

The type of paving plant adopted was what is known as the central mixing plant, consisting primarily of a rock and sand bunker, a material-measuring hopper and a Smith tilting type stationary concrete mixer. Combined with this was an electrically driven derrick and clam-shell bucket for unloading material from cars directly into the bunker compartments, and a cement platform and shed conveniently placed so that the labor of handling cement from the freight cars to the mixer was reduced to a minimum. This plant meets all our expectations for convenience, accurate proportioning of ingredients, and economy of operation, and for our work is far superior to the central proportioning plant or any of the other plant layouts commonly used for concrete pavement construction. Electrical drive relieves us of power troubles; also, the plant is at all times instantly available for turning out concrete for other



**BUILDING CONCRETE STREETS IN PALO ALTO, CALIF.**

1. Best tractor hauling Little Giant scarifier in preparing roadway for grading. 2. Road roller hauling Carr subgrader. 3. Rolling rock in the subgrade. 4. Spreading and tamping the concrete. 5. Finishing the pavement with a longitudinal float. 6. Curing the concrete by the ponding method. 7. American derrick and Clyde hoist for unloading cars at central mixing plant



municipal purposes and is used quite extensively in this way.

We use Professor D. A. Abrams' table for 3,000-pound concrete in proportioning the mixture and follow closely his recommendations regarding the water content. Each batch turned out by the mixer contains 18 cubic feet of placed concrete and consists of four sacks of cement, 0.34 cubic yards of sand, 0.54 cubic yards of rock, and approximately 17 gallons of water. The sand is known as the  $\frac{1}{4}$ -inch size, and the rock varies from 1 inch to  $2\frac{1}{2}$  inches. Concrete is mixed for at least  $1\frac{1}{2}$  minutes.

The concrete is dumped directly into one-ton Ford trucks equipped with Lee, Mantz or Heil gravity-dump bodies of a sufficient capacity to take the full 18-cubic-foot batch from the mixer. These trucks are operating very satisfactorily. They are reliable and speedy and deliver the concrete from the plant to the road for approximately 23 cents per ton, which is a very low haulage cost. The distance from the plant to the work during the past year has averaged over one mile.

#### Pavement Laid in Two Strips

The concrete is laid in two strips in order to effect better control in finishing. By this method a strike board extending from the center of the road to the curb may be used where such a means of tamping would be impractical if an attempt were made to finish the street surface for the whole width in one operation. We have tried both methods and find that it is possible to get a smoother and better concrete surface by laying the pavement in two strips.

The thickness of the pavements for the residence streets now varies from  $4\frac{3}{4}$  to 5 inches. The concrete as delivered by the trucks is first spread by hand, then tamped with a heavy strike board shaped to give the surface the required crown. After this operation the surface is rolled with a light hand roller, then finished with a longitudinal float.

The hand rolling is very beneficial in that it eliminates hair cracks by removing the surplus surface moisture. The longitudinal float was adopted because it was found to make a smoother riding surface than any other finishing tool. This float consists of a flat board 8 inches wide by 12 feet long, provided with handles at each end at a convenient height for two men to operate from

bridges spanning the pavement. The float is moved backward and forward in from 6- to 12-inch strokes in a longitudinal direction, and at the same time is shifted slightly transversely so that the whole surface from center to curb is floated. The operation ironing out the irregularities left by the strike board and roller and leaves the surface true and smooth.

No expansion joints are provided. The neutral cracks which form are poured with grade E asphalt or Roadamite. The main objection to this treatment is that it disfigures the appearance of the pavement, because of the irregular black lines following the cracks. A cement-colored filler would eliminate the unsightliness, and it is hoped that something of this nature may be developed.

The pavements are cured by the ponding method for ten days, then allowed to dry out slowly for ten days more before traffic is allowed on them. Water for sprinkling and curing is furnished from hydrants through  $1\frac{1}{4}$ -inch pipes temporarily laid along the line of the work.

#### Revenue Figures

The revenue and expenditure account of the municipal paving plant for the first year's operation is as follows:

REVENUE	
Paving costs .....	\$117,775.83
Material sold city departments .....	1,731.72
Sale of dirt, cement, etc. ....	786.88
Sundry paving .....	1,385.33
Sundries .....	2,046.24
	<hr/> \$123,726.00
DEBITS	
<i>Grading</i>	
Labor and team hire .....	\$11,101.35
Fuel, supplies and repairs .....	2,962.68
Rock for base ....	1,300.00
	<hr/> \$15,364.03
<i>Curbing</i>	
Concrete curbing and sidewalk construction at street intersections ....	\$4,451.04
<i>Concrete Pavement (preparing mixture)</i>	
Labor unloading cars, mixing concrete and hauling to job .....	\$7,742.12
Power, fuel, repairs, etc. ....	3,810.03
Sand .....	10,575.89
Broken stone ....	13,318.87
Cement .....	44,906.03
	<hr/> 80,352.94
<i>Concrete Pavement (spreading, finishing and curing)</i>	
Labor .....	7,799.12
Supplies and expense .....	1,191.95
	<hr/> 8,991.07

<i>Wearing Surface</i>	
Labor .....	\$264.25
Supplies and expense .....	87.58
Rock screenings..	514.79
Asphaltic road oil.	795.57
	<hr/>
	1,662.19
<i>Office and Accounting</i>	
Salaries and wages	\$3,809.10
Supplies and expense .....	1,288.27
Rents .....	120.00
Testing materials..	333.30
Printing .....	32.35
	<hr/>
	5,583.02
<i>Fixed Charges</i>	
Interest and depreciation on plant equipment (estimated)	4,300.00
	<hr/>
	\$120,704.29
Net profit .....	\$3,021.71

Under private contract as per bids received for this work on March 14, 1921, the cost for the paving done by the city during the year would have been \$184,521.89, as follows:

<i>Curbing:</i>	
6,229.63 feet at \$0.75.....	\$4,672.22
<i>Gutters:</i>	
11,970 square feet at \$0.32.	3,830.40
<i>Asphalt pavement:</i>	
153,000 square feet at \$0.22.	33,660.22
<i>Concrete pavement:</i>	
434,865 square feet at \$0.27.	117,413.55
<i>Grading:</i>	
12,927 cubic yards at \$1.25.	16,158.75
	<hr/>
	\$175,735.14
<i>Incidental expenses, 5 per cent</i>	
	8,786.75
	<hr/>
Total cost .....	\$184,521.89

<i>Actual cost to property owners for the work as done by the municipal paving plant:</i>	
<i>Curbing:</i>	
6,229.63 feet at \$0.65.....	\$4,049.26
<i>Pavements:</i>	
599,836 square feet at 18.2c.	109,170.15
<i>Includes grading and paving.</i>	
<i>Incidental expenses.....</i>	0.00
	<hr/>
Total .....	\$113,219.41

Saving to property owners..... \$71,302.48

For the municipal paving plant to make such a large saving over contract work in its first year's run, and at the same time to operate without loss, is quite remarkable and extremely gratifying to those interested in this project.

Following is a summary of the cost for labor and material:

<i>Cement:</i>	
\$3.21 to \$3.56 per barrel, f.o.b. Palo Alto, less 5 cents per barrel for cash. Credit for empty sacks 10 to 15 cents each.	
<i>Crushed gravel:</i>	
\$1.50 to \$1.60 per ton, f.o.b. Palo Alto.	
<i>Sand:</i>	
\$1.50 to \$1.60 per ton, f.o.b. Palo Alto.	
Sand and gravel weigh approximately 2,800 pounds per cubic yard.	
<i>Common labor:</i>	
\$4 per day of 8 hours.	
<i>Cement workers:</i>	
\$4.50 to \$6 per day.	
<i>Form setters:</i>	
\$4.50 to \$5.50 per day.	
<i>Ford one-ton truck drivers:</i>	
\$4.50 to \$5 per day.	

ACKNOWLEDGMENT.—From a paper read before the League of California Municipalities.

## Black Base for Heavy Boulevard Traffic

Commissioners Adopt Asphaltic Concrete as Foundation for Sheet Asphalt on Washington Boulevard, Chicago, Ill.

By John B. Hittell

WASHINGTON Boulevard from Halsted Street to Ogden Avenue, under the jurisdiction of the West Chicago Park Commissioners, is being repaved with a standard 2-inch sheet asphalt wearing surface upon an asphaltic concrete black (black base) foundation. The roadway width is 48 feet and the length 4,630 feet; the square yardage approximates 26,000. The Commonwealth Improvement Company of Chicago, being the lowest bidder, secured the contract.

While nominally a boulevard, the layout

of the street with its half or staggered intersections is such that heavy traffic will be permitted in going between intersecting outlets. There are thirteen streets leading onto the boulevard at intervals of about 330 feet from which unrestricted traffic will cross over or use the boulevard to the next nearest intersection. Halsted Street, the eastern terminus of the improvement, is only a mile and a quarter from Lake Michigan and lies at the door of the west side manufacturing district. Within the limits of the improvement the street has long since



passed the state of a residential boulevard, and is fronted by many manufacturing or heavy trucking concerns. Among these may be mentioned the National Biscuit Company, the United States Post Office Garage, and the Chicago Machinery Exchange. These conditions, the general disturbance of the macadam foundation prior to the present paving operations, and a small increase in elevation of the new surface were among the reasons prompting the Commissioners in selecting a resilient instead of a rigid base for the wearing surface.

William G. Barclay, Superintendent, West Chicago Park Commissioners, in speaking of the improvement said:

"This part of Washington Boulevard was paved with asphalt in 1893, and some of the intersections were repaved in 1906.

"The areas of the numerous intersections as well as those of parts of the roadway from which heavy or truck traffic cannot be barred owing to the fact that many of the intersecting streets do not continue in line across the roadway, summed up, are probably 50 per cent of the entire area, so that in effect the pavement will be subjected to a traffic similar to that on any business street near-by.

"The disturbance of the old macadam foundation was very general—one corporation made openings every 25 feet along the street—and much rehabilitation work on underground services was necessary due to the period of 29 years between the placing of the pavement in 1893 and this.

"The Commissioners, knowing that additional materials were needed to provide a proper foundation, carefully considered the merits of portland cement concrete and black base. Their investigations of the bituminous type of foundation in several cities, and the opinion of the engineers experienced in pavement construction convinced them that the black base would be

the better of the two; being resilient, it absorbed some of the shock of impact of traffic, thus protecting both the wearing surface and the macadam base; full contact would be had with the base, and perfect bond with the wearing surface; the binder course could be eliminated, and the work would progress more rapidly, as no time would be lost as in waiting for an hydraulic concrete base to cure, an important consideration at this time [fall] of the year and the demands of traffic."

The placing of the black base involved no methods of construction differing from those commonly employed in laying binder. Where the depth of it was more than 3½ inches, the base was laid in two courses, analyses of which are shown below.

Standard Mexican asphalt produced by the Standard Oil Company of New Jersey is used in the asphaltic concrete base and wearing course, typical analyses of which are as follows:

Base			Wearing Course		
Bitumen	.....	4.9%	Bitumen	.....	10.0%
Passing 200 mesh	2.0		Passing 200 mesh	12.3	
" 80 "	9.5		" 80 "	29.9	
" 40 "	5.6		" 40 "	37.7	
" 10 "	3.1		" 10 "	10.1	
" 4 "	10.2				
" ½ "	24.6		Pen. AC.	.....	41
" ¾ "	28.4				
" 1 "	11.7				

For the West Chicago Park Commissioners William G. Barclay, Superintendent, has general charge, and William G. Keith, engineer, Thomas Newton, field engineer, and William A. Basse, inspector, are responsible for details of office and construction work. Alexander Todd and Walter Leininger, constituting the Commonwealth Improvement Company, are giving particular attention to the construction, with William G. Foley as foreman in charge. Walter H. Flood & Company and the Chicago Paving Laboratory are acting respectively as chemical engineers for the contractor and the Commissioners.

## New York State to Give Water-Works and Sewage Disposal Course

THE Division of Sanitation, New York State Department of Health, has announced that beginning February 5 it will give a course for sanitary inspectors, superintendents and operators of water-works and sewage disposal plants. This course involves some preliminary reading,

then a series of lectures on public health administration, nuisances, sanitary inspection of schools, and public buildings, milk, food inspection, heating and ventilation, plumbing, mosquito extermination, garbage disposal, rural sanitation, sewage disposal, water-supply and other health topics.

# Richmond Removes Wooden Poles from Streets

California City Takes Noteworthy Step in Installation of Steel Lighting Standards and Trolley Poles

UP to about one year ago the main business street of Richmond, Calif., had a very unsightly appearance. Poles of all sizes and all shapes, from the old sawed, square redwood poles to the unpainted, round cedar poles used by the various public utilities, leaned in all directions and destroyed the beauty of the street. Municipal officials were distinctly displeased with the appearance of the streets and threatened to force the various utilities to place their wires underground. This brought a condition of affairs which jeopardized the friendly relationship between the city and the utilities.

The district affected consisted of 28 blocks. They had been lighted with 21 4-ampere series magnetite arc lamps. It was felt that the main streets of the city should be lighted more efficiently, but with a larger number of poles on the streets the unsightly pole situation would be aggravated rather than helped if additional electrolier poles were installed. The Western States Gas and Electric Company took the

lead and proposed to the City Council that it approve the removal of all wooden poles, all transformers and high-voltage wires, and the installation of steel poles to be jointly used by the interested companies and upon which bracket lamps of 400 candle-power would be placed. The City Council approved these measures and went ahead making arrangements with the other public utilities. No insurmountable obstacles were encountered. On the contrary, every company interested lent every assistance possible to making the installation a success.

Steel poles 37 feet long, set 6 feet in 18- to 20-inch squares of cement, were used. These poles were made in three sections, the bottom section being 8 inches in diameter, the middle section 7 inches, and the top section 6 inches. A cap fits over the top with a short cross-arm, and the wire feeding the bracket lamp loops under this cap and goes down the inside of the pole to the bracket lamp. In each bracket is a compensator, which changes the amperage



THE MAIN STREET OF RICHMOND, CALIF., AS IT APPEARED BEFORE THE REMOVAL OF WOODEN POLES AND THE INSTALLATION OF ITS NEW LIGHTING SYSTEM





**THE NEW COMBINATION TROLLEY AND LIGHTING POLES WITH DOUBLE LIGHTING UNITS GREATLY IMPROVE THE APPEARANCE OF THE THOROUGHFARE**

from 6.6 to 15 amperes, which is required by a 400-candle-power lamp. The compensator has taps so that a 20-ampere or 600-candle-power lamp can be easily used if desired. The lamps are constant-current, series installations, and the wire feeding them runs overhead along the steel poles.

The traction company agreed to purchase an interest in the steel poles, to remove all its wooden poles and to place its feeder wires and trolley wires on the steel poles, and the Pacific Gas and Electric Company agreed to remove its poles and wires to another street. The Western States Gas and Electric Company removed all its transformers and its 2,300-volt lines, placing the transformers on side streets and feeding into the business streets. The flat rate sign and window lighting circuit is unique, being operated from a time switch in the substation. The time switch controls a magnetic switch in a steel box on a steel pole. These magnetic switches are located in the center of the sign lighting load. This system eliminates the running of heavy wires from the stations for signs and windows. As the load increases, it is only necessary to add magnetic switches along the line.

The only wires on the steel poles are the secondary wires, 110-220-volt, 3-wire and 3-phase, 220-volts, or a 4-wire system. This system is run on each side of the street. The secondary wires feed from the transformer stations located on side streets into the main street and spread in both directions on from two to four blocks, where they dead end. Secondaries from other stations dead end in the same manner, so that if one bank of transformers should burn out, it is easy to connect on to another bank.

The entire change of the old system was accomplished with no interruptions to service. The lamps are installed four to each block—two directly across from each other in the center of each block, and two on each corner diagonally across from each other. There is a total of 111 lamps, covering over a mile and a half of the main business streets.

The system is so attractive and the illumination so brilliant that many favorable comments have been received. The work was done under the direction of George N. Rooker, Manager of the Western States Gas & Electric Company, and the steel poles were furnished by the Electric Railway Equipment Company, Cincinnati, Ohio.

# Garbage Collection and Disposal in Florence, Italy

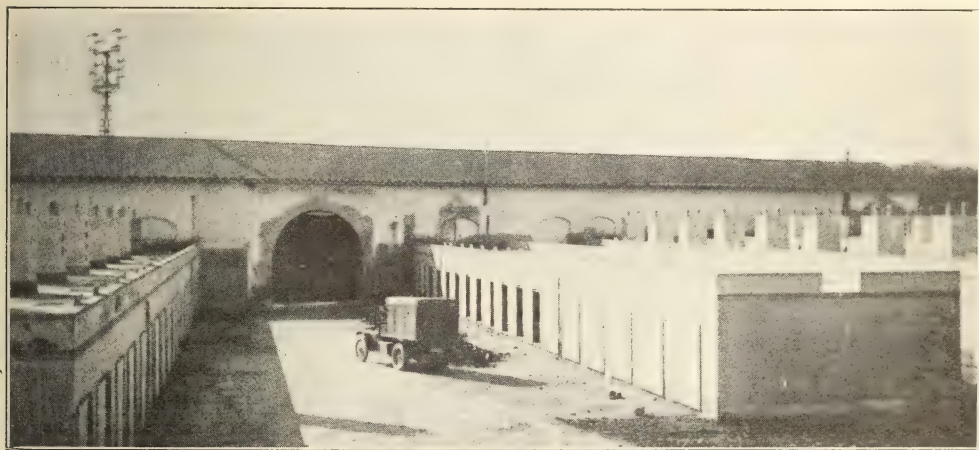
**Beccari System of Zymothermic Cells Disposes of Garbage Without Odor and Produces Fertilizer**

**G**ARBAGE removal and disposal in Florence, Italy, is entirely a municipal function, carried out under the direction of a department known as the Office of Public Cleaning and Similar Services. This department is responsible for cleaning the streets, as well as for the removal of garbage from private homes and public places. Refuse from the streets is assembled by sweepers in small hand-carts of a half-cubic-meter (.65 cubic yards) capacity and wheeled to a transfer point within the city.

metric tons, or a yearly total of about 40,000 metric tons (44,000 tons).

## The Disposal Plant

The disposal plant at Novoli is modern. It is constructed on the Beccari system and consists of fermentation cells of about 20 or more cubic meters capacity each (13, 26 or more cubic yards). These cells are built of stone or reinforced concrete, 2½ meters (8.25, feet high, with rectangular dimensions according to the cubic space re-



**GARBAGE DISPOSAL PLANT OF FLORENCE, ITALY, SHOWING INSTALLATION OF BECCARI ZYMOTHERMIC CELLS**

There it is loaded into closed horse-drawn vans of 4 cubic meters (5.2 cubic yards) capacity or motor vans of 6 cubic meters (7.8 cubic yards) capacity and conveyed to the municipal disposal plant at Novoli about 2 miles outside the city limits. House refuse is collected in horse-drawn metal vans with a driver and a crew of four men equipped with baskets, in which the material is carried from the interior of the premises. There is no system of placing garbage receptacles outside the house to facilitate this work.

The city owns 15 horse-drawn vans and 12 motor vans for this service. The amount of garbage collected daily is from 120 to 136

metric tons. This system of garbage disposal was developed by Dr. Beccari. By the use of the Beccari system a fertilizer is produced which is rather high in nitrates, phosphates and potash. A plant after this system consists of cells, four to a unit, each cell measuring 8 by 9 by 10 feet inside dimensions. There is a trap-door at the top through which the garbage is charged into the cell, and another full-size sliding-door at the side of each cell through which the final product, an earthy humus, is removed at the end of the fermentation cycle, usually 30 to 40 days, depending on the character of the charge and the temperature of the



outside atmosphere.

The bottom of the cell has a perforated concrete floor through which the liquid from the garbage drains into a pit. This flows to a central sump, from which it is allowed to drain into the sewer or is pumped back over the fermenting garbage, should the latter become too dry. The maximum temperature of the fermenting garbage is approximately 140 degrees to 170 degrees Fahrenheit, at which temperature the nitrifying bacteria are developed and denitrifying and pathogenic bacteria are destroyed. Garbage in these cells has been inoculated with the germs of diphtheria, scarlet fever, etc., and the spores of anthrax, the latter being the most virulent spore-forming organism known, and all have been completely destroyed within 20 days from the beginning of the cycle.

The upper doors of the cells are water-sealed so that no gases escape. In the roof of each cell there is a small tower in which diaphragms are placed which cause the gases arising from the fermenting masses to pass over a material which, when saturated with certain substances, serves to fix and convert the gas into sulphate of ammonia. The inside of the cells has shelf-like projections built around the side walls, immediately under which are air passages through which air is permitted to circulate, by which means the mass is bathed in air and fermentation accelerated. The garbage is permitted to remain in the cells for 30 to 40 days, by which time it is transformed into an innocuous humus of rather high fertilizing value. About 25 cubic yards of garbage are placed in a single cell, the shrinkage during fermentation being about 17 per cent, so that the final product is about 21 cubic yards. In computing the size of plant necessary for any given city, approximately one cell is allowed per 1,500 population, or one unit of four cells to about 6,000 population in the United States.

One of the advantages of this system, in spite of the fact that about 16 per cent of the garbage in the United States is produced in one month, is that the units do not deteriorate when not in use and can be used for storage purposes during the winter, when the shipment of fertilizer is inadvisable or is impossible. In addition to the city of Florence, the cities of Padua, Pistoie, Carrara, Novara, Viareggio, and many smaller Italian towns use this system for

the disposal of garbage, and Naples, Bologna, Livorno, Spezia, Milan, Palermo, and others have contracted for plants.

#### Beccari Plant in Florence

Some years ago the city of Florence constructed four Beccari cells as an experiment. The results were so encouraging that the installation was increased, until to-day there are 204 cells of 20 cubic meters (25 cubic yards) capacity each, built in five double rows. Each cell has the characteristic gas-collecting tower and a trap-door in the roof for charging the garbage.

The garbage that flows daily to Novoli is first subjected to a close search in order to remove all matter that has a sale value. At present this process is carried on by hand and to such good purpose that the proceeds from the salvage of bones, rags, papers, glass, metal, etc., pay the cost of sorting. The remaining organic matter is placed in the zymothermic cells, together with a certain quantity of the more liquid product of cesspools, which, together with a thorough circulation of air, induces complete fermentation, with consequent extermination of all germs. The final product, a humus, a very rich organic fertilizer suitable for agricultural or other purposes, is marketed in three qualities, which, although similar in make-up, are slightly different in form. The coarsest sells at 40 lire\* (\$2.00) a metric ton and is suitable for tree fertilization. The medium size sells for 50 lire (\$2.50) a metric ton and is used for general agricultural purposes. The finest, used by gardeners and vegetable growers, sells for 60 lire (\$3.00) a metric ton at present, but will shortly be raised to 80 lire (\$4.00). This fertilizer is absolutely odorless and easily used, the user having the assurance that all germs have been destroyed that might have rendered the use of natural garbage dangerous.

#### Cost of Removal and Disposal of Garbage

For the removal of garbage, private individuals in Florence are charged on a sliding scale, based on the number of rooms occupied. The range is 0.75 lire (3.75 cents) a room for from 1 to 4 rooms; 1 lire (5 cents) a room for from 5 to 7 rooms; and 1½ lire (7.5 cents) a room for all above 7. These rates are for 6 months' service and payable

\*Lire are quoted at 5 cents.

in advance. For public offices, the rate is 4 lire (20 cents) for each cubic meter (1.3 cubic yards) of material removed during the six months, while for industrial establishments, when the municipality will undertake the work, the rate is 6 lire (30 cents) for each cubic meter of material removed from the premises.

The collection and removal of garbage result in a deficit to the municipality, owing to several factors, principal among which are the excessive costs of labor and hauling. The actual reduction of garbage to fertilizer is self-supporting. It has not been possible to obtain figures for expenses as compared with earnings, but the proceeds from sales of the product amounted to approximately 400,000 lire (\$20,000) in 1922. Laborers in the division of collection are employed on a basis of 15.50 lire (77.5 cents) minimum wage for an 8-hour day. They are not permitted by the unions to contract for more than 8 hours.

The entire cost of garbage removal and disposal for the year 1921 was 3,036,195 lire (\$151,809.75), of which the labor cost represented 2,100,000 lire (\$105,000), the balance being chargeable to up-keep of

equipment, gasoline and other maintenance costs. Fees collected and sale of the articles salvaged in the sorting process brought in 350,000 lire (\$17,500), leaving a net expenditure of 2,686,195 lire (\$134,309.75) for the service for one year.

The total number of laborers employed, including sweepers, drivers, chauffeurs, and men at the disposal plant, is 423.

### Conclusion

The system is regarded as entirely satisfactory in Florence from an economic standpoint as well as that of sanitation and the elimination of nuisance. Testimony of this satisfaction is found in the plan to increase the number of cells by 100 as soon as circumstances will permit. With these it is expected to introduce certain mechanical features, such as belt carriers, to facilitate sorting and the lifting of material to the trap-doors in the roofs.

We are indebted to W. Roderick Dorsey, American Consul, Florence, Italy, for a large portion of the data from which this article is prepared. Material has also been courteously supplied by Professor Carlo Botto of Florence, Italy.

## Harrisburg, Pa., Sees Economy of Single Lighting Standards

THE cost of lighting the seventy-one 5-lamp cluster standards in Harrisburg, Pa., can be reduced from \$85 to \$64.50 per standard by replacing the five small lamps with a single high-powered lamp, according to City Electrician C. E. Diehl. If similar changes are made in the twelve 7-lamp cluster standards on the

Mulberry Street bridge, the annual cost per standard can be cut from \$112 to \$64.50. The annual saving on these lights will be about \$2,097. Consequently, the City Council is being urged to authorize the change, providing money in the 1923 budget to change the standards from clusters to the single-lamp type.

## Wood Block Pavements in Japan

TOKIO, JAPAN, is using Douglas fir blocks, creosoted locally, for paving. The size of the blocks used is 6 x 3½ x 3½ inches. They are laid on a concrete foundation which has been covered by a layer of mortar. This mortar is mixed in the proportion of one part cement to three parts sand. The wood blocks are laid on the mortar without wetting. Wide cracks are left between the rows, which are later filled with asphalt. The asphalt is poured so as not to entirely fill the cracks. About one-half inch is left near the surface and filled with dirt or sand. No covering or top dressing is used. This method of laying

the block is probably the reason why there has been some complaint about a portion of the wood block paving which was put down about a year ago. If these blocks had been thoroughly treated and laid as they are in Europe and America, the pavement would probably have lasted for at least ten years.

A very rough estimate of the percentage of various kinds of paving planned for Tokio to be carried out prior to the end of 1926 is as follows: present completed wood block paving, 1 per cent; future wood block paving, 10 per cent; stone, 5 per cent; asphalt, 52 per cent; and asphalt macadam, 32 per cent.



# Activated Sludge Process Grows in Favor

New Sewage Disposal Method to Be Used in Los Angeles and Other American Cities

IT is quite generally conceded that the activated sludge process is the most perfect method of sewage disposal at the present time. Its growth in America and European countries has been widespread. Since the discovery of the process, early in 1914, the method has been adopted for several municipalities, and an exceedingly large number of experimental plants have been put in operation. The most notable ones in existence at the present time are at Davyhulme (Lancashire), Worcester, Stamford, Aertree, Sheffield, Bradford, Tunstall, Blackpole (Worcestershire), Whitney (Blanket Co.), St. Albans, Withington, Moreton (Dorsetshire) Birmingham, Reading, Baguely and Stoke-on-Trent, in England. In the United States the best-known plants are at Houston, Texas, and Milwaukee, Wis.

Recently a plant has been installed at Woodstock, Ontario, to handle 1,500,000 imperial gallons per day, dry weather flow. A small plant has also been installed at Brampton, Ontario. A plant was put in operation on October 18, 1921, at Gastonia, N. C., which treats 1,000,000 gallons of sewage daily. In October, 1921, an installation was put in operation to treat the waste (600,000 gallons daily flow) from the Decker Packing Plant at Mason City, Ia.

Experimental plants have been in operation for some time at Urbana, Ill., the Calumet region of the Sanitary District of Chicago. This plant when completed will have a capacity of 1,750,000 gallons and the plant of the Desplaines River district of the Sanitary District of Chicago, when completed will treat the sewage from a population of 30,000.

Works are in the process of construction

in Milwaukee which will treat the entire sewage from that city, population 588,750, and at Indianapolis, Ind., population 314,000. Pasadena, Alhambra and South Pasadena, Calif., have decided to build a 3,500,000-gallon plant, described in detail in the January, 1923, issue of *THE AMERICAN CITY*. Other plants in the process of construction at the present time are in Brisbane (Australia), and Singapore (India).

Rotham, Hanley and Mansfield (England) are considering schemes along the line of the Sheffield works. Los Angeles, Calif., is also considering the adoption of the activated sludge process for the treatment of sewage of that city.

The experimental plants in this country have practically all been with the diffused air treatment, which consists of blowing air through the sewage and sludge, after it has passed through filtros plates.

Mechanical agitation, that is, the use of revolving paddles, has proved successful at Sheffield, England. These paddles suck the air through a tube by creating a vacuum, and rotation is carried for 8 hours. By this method the sewage is brought in contact with the air at its surface only; the power required is to mix the sewage and induce a current, and by rippling the surface it increases the surface exposed to the action of the air. The Sheffield sewage may be a special type, and experiments made elsewhere indicate that mechanical agitation alone will not purify sewage in the presence of activated sludge without the expenditure of much more energy than the air diffusion method; the original and maintenance costs also seem to be somewhat greater.

## New Lease on Life of Road

Twenty-second Avenue, Meridian, Miss., paved with brick in 1898, was resurfaced in 1921, the 23-year-old brick being turned over and filled with asphalt. The original cost was \$2.25 per square yard, and the resurfacing cost brought the total to \$2.90 per square yard. City officials expect the reconstructed pavement to last another 23 years at least—a total of 46 years of service for the brick. The pavement carries freight-yard traffic.

# The Snow Removal Organization in Newark, N. J.

Equipment and Personnel Ready for Clean-up as Soon as Two Inches of Snow Has Fallen

**T**HE snow removal organization of Newark, N. J., operating under the Division of Works, consists of the Chief Engineer, an engineer in charge, three special inspectors, about twenty general inspectors, and eight repair mechanics who, working in double shifts, make rapid repairs on pieces of equipment which become damaged. Actual snow removal is started as soon as two inches of snow has fallen. The work is prosecuted as rapidly as possible thereafter until the fall has stopped and the work of clearing and removing it has been completed. Labor is furnished by the street contractors of the city. The mechanical equipment consists of nine plows, three 10-ton tractors, and thirty-



**MACK FLUSHER EQUIPPED WITH SNOW-PLOW, USED IN NEWARK, N. J.**

five bottom-dump, team-drawn refuse wagons. Numerous additional motor trucks furnished by contractors are brought into use as the snowfall requires.

The cost of clearing snow varies, depending upon whether the fall occurs during the day or the night and whether it is accom-

panied, preceded or followed by rain. On February 4, 1920, there was a fall of 20 inches in Newark, the heaviest fall the city has experienced in a great many years. On account of this storm, New York and many other large cities were tied up for weeks. In Newark, however, throughout the storm, and afterward, all trolley and jitney schedules in the city were maintained with no noticeable interruption. All the business arteries were open for the free passage of traffic within eight hours during the snowfall. The cost of the removal of this snow was slightly less than \$100,000.



**A 10-TON HOLT TRACTOR WITH SNOW-PLOW ATTACHED USED FOR REMOVING SNOW FROM BUSINESS STREETS IN NEWARK, N. J.**



Local contractors cooperate with the Division of Works and have their gangs in readiness at vantage points in the downtown section, by the time the Chief Engineer is ready to put them to work. The initial attack is made in the very heart of the business district.

The first gangs go to work at the corner of Broad and Market Streets, and the succeeding ones tackle parallel streets in the business section, gradually radiating out of the business arteries. The down-town section of the city is cleaned of snow from gutter to gutter. The snow is carted away and disposed of in sewer manholes and also dumped over the city docks into the Passaic River. When the gangs and equipment start working in the business district, they

concentrate first on clearing snow from the traffic lanes, pushing it to the gutter and afterward piling and removing it. The business arteries, of which there are fifteen, and all of which extend from the center of the city over to suburban towns, are ploughed and scraped all the way to the city lines. In addition, a half-dozen heavily used cross-town streets are cleared of snow, and twelve jitney routes in various sections of the city are scraped so as to provide for the uninterrupted maintenance of schedules by the busses. Snow is thoroughly cleaned in front of all railroad stations and freight depots, coal pockets, theaters and food stations, including packing-houses and milk depots, to expedite the movement of congested pedestrian traffic.

## Snow Removal in Salt Lake City, Utah

By T. T. Burton

Commissioner of Streets and Public Improvements, Salt Lake City

**S**ALT LAKE CITY is probably the only city in the country that has to handle snow from property line to property line, a distance of 132 feet. Inasmuch as it is an aim of the city to facilitate winter shopping, it is necessary that snow be loaded

very rapidly. The machine which has been developed for this purpose by the city is mounted on a Barber-Greene bucket loader without changing any of the framework. This makes the pitch of the machine a little too steep for permanent use. However, we



SALT LAKE CITY'S EFFECTIVE MACHINE FOR LOADING SNOW INTO MOTOR TRUCKS

are able with the use of a fleet of motor trucks equipped with Baker snow-plows to push the snow into one large windrow. The machine is then headed right up to the windrow. The 5-ton trucks, equipped with 12-inch flareboards, are backed underneath the chute of the elevator and are loaded in less than 2 minutes each. The rest of the snow, left on the streets after the snow-plows and loaders have completed their work, is melted off quickly with the use of hot water from the local sulphur springs within a mile or so of the business district.

On January 2, 1923, we completed cleaning up the fourth heavy snowstorm of the winter, and the entire business section has been completely free from snow, in most cases, within 12 hours, the last snow taking 48 hours.

The machine we are using not only does away with from 35 to 50 shovelers on the streets, but enables us to do two or three times as much with the trucks, as they are on the move all the time. All three factors, the Baker snow-plows, the hot springs

water, and the loader, make a most formidable snow-fighting outfit.

The idea used in the elevator and the snow loader was suggested by the drag chain conveyor of our Western Mines and Mills. The chute is made of I-beams with a steel bottom, and the steel paddles, 36 inches long and 8 inches wide, are carried up the chute with a chain belt running over sprocket wheels. As the chain belt draws the belt up the chute, the caterpillar moves ahead. These blades are placed 18 inches apart and cut a large amount of snow with each blade. There are 36 blades working in the 26-foot chute. There is no necessity for workmen at the mouth of the chute, except to pick up straggling snow on the windrow wider than the entrance of the chute. However, the machine can be made to operate in almost any width of windrow.

The machine now in use was constructed very quickly to see whether the idea would be practical. It has been so successful that we plan to equip one or two more immediately for the city's use.

## Methods of Snow Removal in Walpole, Mass.

By Harry A. Whiting

Town Treasurer

**W**ALPOLE, MASS., a town of about 6,000 inhabitants, situated on the Neponset River about half-way between the cities of Boston and Providence, has given an object lesson in economically and effectively removing the winter's heavy snowfall so that the inhabitants can go about their usual occupations as easily as in summer.

In the spring of 1921, the town, on advice of the town engineer, E. F. Durfee, issued bonds for \$30,000 for the purchase of highway equipment, which included three 2-ton trucks, a stone crusher, a steam shovel and an asphalt plant. For a number of years many of the citizens had been aware that under the old system of graveling the streets then prevailing, large sums of money were being expended without any improvement in the surface conditions of the streets.

The town has numerous large banks of gravel which is of but little value for road

material in its natural state owing to the unevenness of its composition. Under the new methods adopted, however, all material is run through the crusher and separated by the screens and made ready to be placed upon the road. Six inches of the larger stones is placed at the bottom of the street with a stone spreader, and this is covered with peastone and sand and rolled with a 10-ton roller while wet. Then the final coat of oil or Tarvia is applied. A permanent road has been built for about \$5,000 per mile, the usual cost of the old-fashioned unsatisfactory gravel road. A Cletrac model W tractor and a Fordson tractor have been added to the equipment, thus eliminating the use of horses in street construction.

As busses have replaced the electric cars in Walpole as means of transportation within the limits of the town, the present town engineer, Allston F. Hart, decided to





A TYPICAL SCENE IN THE CENTER OF WALPOLE, MASS., SHORTLY AFTER A HEAVY SNOWFALL

apply up-to-date methods in snow removal so that there would be no such blockade as existed in the town in the early part of 1920. Two of the 2-ton trucks were equipped with one-blade snow-plows, such as are used on the state highways, and these trucks were started as soon as the first snow fell, in order to keep the bus route from South Walpole to East Walpole and the state highway from the Norwood to the Norfolk line clear of snow for a width of about 20 feet. One of these trucks also kept the main street to Medfield open.

The Cletrac tractor was fitted with a Chase snow-plow, and the Fordson with a Starkweather snow-plow, and these tractors were assigned to the job of keeping open for auto traffic the remainder of the 75 miles of Walpole streets.

During the week of February 6 to 13 in

the year 1920, the town spent \$3,101.73 in an unsuccessful attempt to keep the streets open for traffic. This year, with similar conditions of snowfall, the largest week's expense for snow removal has been \$481.41; every street in town is cleared for the easy operation of motor vehicles, and busses have never been a minute late by reason of bad wheeling. Included in this sum is the cost of plowing out the sidewalks over the entire town with horse plows. The cost of operating the two trucks and two tractors, including gasoline and wages of two men on each unit, is about \$43 per day of 8 hours for the four pieces.

These almost ideal winter street conditions have been brought about by the foresight and systematic planning of the town engineer, and by the loyalty of the men who have kept the roads open.



MEDIUM-WEIGHT TRACTOR EQUIPPED WITH V-SHAPED SNOW-PLOW BREAKING OPEN A ROAD IN WALPOLE, MASS.

# Maintaining the Health of Municipal Employees

By Clinton Rogers Woodruff

**P**HILADELPHIA is doing a splendid and record-establishing work among its policemen and firemen in looking after their health. The Civil Service Commission, through its medical examiner, protects the entrance to the city service. Everyone seeking a position under the Philadelphia city government, whether a day laborer or the chief of the most important bureau, must undergo a medical examination, to make sure that his or her health is sound and that he or she is physically fit to do the work. This is supplemented by a reexamination immediately prior to the applicant's being sworn in, so as to make sure that he has suffered no incapacitating injury or illness between the time he was examined by the Commission and the time of appointment.

The Chief Surgeon of the Bureaus of Police and Fire, Dr. Hubley R. Owen, has always worked on the principle that the city is a large industrial plant, and his object has been to give the greatest number of days' service per man to the city, and personally to administer or to supervise the medical and surgical needs of the members of the Bureau of Police and Fire. Any member of either bureau reporting off duty because of illness must also report to his office. If this member is not able to report because of sickness or injury, he is immediately visited by one of the district surgeons, and a report is rendered to the Chief Surgeon. The members of the bureaus appear to be very willing to report, not only obeying the rules as stated above, but constantly seeking advice even when not incapacitated for work, thus following out the idea of having "a family doctor."

It is, of course, impossible to attain this object as well in the Department of Public Safety as it can be attained in an industrial plant, where practically all the employees are housed under one roof, and where it is only a question of a few minutes to report to the doctor. The city cannot encourage its men to report for trivial illnesses.

The Chief Surgeon has every facility for handling surgical cases, and also uses the ward for police and firemen at the Philadelphia General Hospital. He has a nose and throat dispensary three days a week, a neurological dispensary once a week, a daily eye dispensary, and a daily medical dispensary. He has arrangements with the Dental School of the University of Pennsylvania to care for the teeth of the members of the bureaus. Medical cases which he does not consider himself qualified to treat are sent to Dr. Henry K. Mohler, Medical Director of the Jefferson Hospital and District Surgeon of the Fifth Police District, for his examination and advice. During the coming year, it is hoped to perfect the work of the medical dispensary. There is excellent X-ray apparatus in the City Hall office, so that it is possible to take photographs immediately.

In the fall of 1920, every member of the Bureaus of Police and Fire received a physical examination, under the Chief Surgeon's supervision, by the physicians on the staff of the Henry Phipps Institute. In this way there was a thorough check on the physical condition of every policeman and every fireman. By this examination, a number of cases of incipient tuberculosis, diabetes, etc., were found, and treatment was recommended for all deficiencies. At first, when the orders were issued for this examination, the members of the bureaus hesitated, as they were somewhat suspicious of the intent of the examination, but when it was explained to the men, they more than willingly submitted to it.

There is a large field for the prevention of disease among the police and firemen, and the Chief Surgeon is, step by step, handling this problem. Prevention of accidents is in the same category, but this prevention among the police and firemen is a different problem from the prevention of accidents in industrial plants.

A complete reorganization of this branch of the Department of Public Safety has been asked for, to enable the Chief Surgeon



to have salaried division surgeons in place of the present district surgeons paid by fees. It is not thought that the work will be performed better by salaried physicians, but the medical care of the members of the bureaus, as well as the medical care of the prisoners, has increased to such an extent that the appropriation now required is excessive, and, for this reason, it will be economy to have salaried division surgeons.

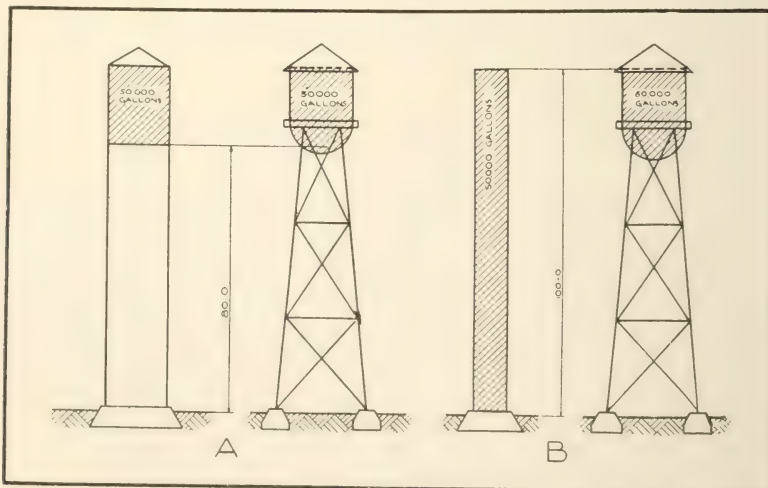
In every way possible, efforts are being made to prevent illness, to reduce expenses and to care for the sick and injured, and with a large measure of success. The police

and fire forces of Philadelphia are constantly improving in health and morale. It will be some time before all these plans have their full measure of results. It will also be some time before the effects of the war are entirely overcome, as the city was compelled to take the men it could get during that period rather than the men that it wanted. These are gradually being improved by care and attention, or eliminated for unfitness, and through improved service methods and health methods, the force is reaching a high standard of municipal efficiency and usefulness.

## Stand-Pipes or Elevated Tanks for Water-Works Systems?

**M**ANY municipal officials who are planning water-works systems come to the need of a tank for holding water at an elevation either for storage or to maintain pressure. They first consider a stand-pipe, that old-fashioned tall tube commonly built years ago for small-town water-works. Very few stand-pipes are

an installation, and in order to provide sufficient pressure throughout the town, the entire capacity should be above 80 feet. An elevated tank of this capacity is about 19 feet in diameter by 25 feet 6 inches in depth. It weighs about 56,000 pounds and requires 28 cubic yards of concrete for its foundations. If a stand-pipe fulfilling the same



built to-day, as compared with the number of elevated tanks. There is a reason for this, namely, that it is uneconomical for storing water at an elevation.

Let us take a typical case and work it out. Consider a water-works for a town with a population of 500 to 1,000. A 50,000-gallon tank is a common size for such

requirements were built, it would have to be 19 feet in diameter by 104 feet high. It would weigh 77,000 pounds. The foundation would have to be rather large in order to prevent overturning and would require 140 cubic yards of concrete.

These two structures are shown in the accompanying diagram A. If we consider

that the steel work would cost about  $7\frac{1}{4}$  cents a pound and the concrete \$14 a yard, the total costs would be as follows:

STAND-PIPE	
Steel, 77,000 pounds or.....	\$5,590
Concrete, 140 yards or.....	1,960
Piping .....	50
Total .....	\$7,600
ELEVATED TANK	
Steel, 56,000 pounds or.....	\$4,060
Concrete, 28 yards or.....	390
Piping .....	500
Total .....	\$4,950

In other words, for the same service, the stand-pipe would cost over 50 per cent more than the elevated tank. It has often been assumed that the water in the lower part of a stand-pipe is just as useful as the water in the upper part. This, clearly, is wrong. If the water-level should be permitted to fall below the level of useful pressure, and a fire should break out at some point in the town, the stand-pipe water-supply would be worthless, as the pressure in the fire hose would probably not be sufficient to produce an adequate fire stream with the strength to carry itself into the fire. The National Board of Fire Underwriters in its schedule

for grading the water-works of small towns states that if the stand-pipe is used for the gravity supply, the top 25 feet of the capacity only should be considered as useful.

If a hill is available on which the tank may be placed, the tower may be shortened, or if the natural elevation be high enough, the tower may be done away with entirely, in which case a flat bottom tank of the most economical dimensions should be built. This type of tank, however, should not be of the stand-pipe shape, but of large diameter and of shallow depth.

It frequently happens in the design of a water-works system that both stand-pipes and elevated tanks are considered and a comparison of costs made between structures of equal capacity and equal height. Figure B illustrates two such structures. This comparison is wrong. The stand-pipe has but a small part of its volume of water elevated to a useful height, whereas all the water in the elevated tank is useful. In general it may be stated that if a given volume of water is to be stored at some elevation above the ground, an elevated tank will cost less than a stand-pipe.

—*The Water Tower.*

## Make Your Water-Works Grounds Attractive

It Is Good Advertising for the Small Town as Well as the Large City

By R. E. McDonnell

Burns & McDonnell, Consulting Engineers, Kansas City, Mo.

IT is almost impossible to overdo the beautifying of water-works grounds.

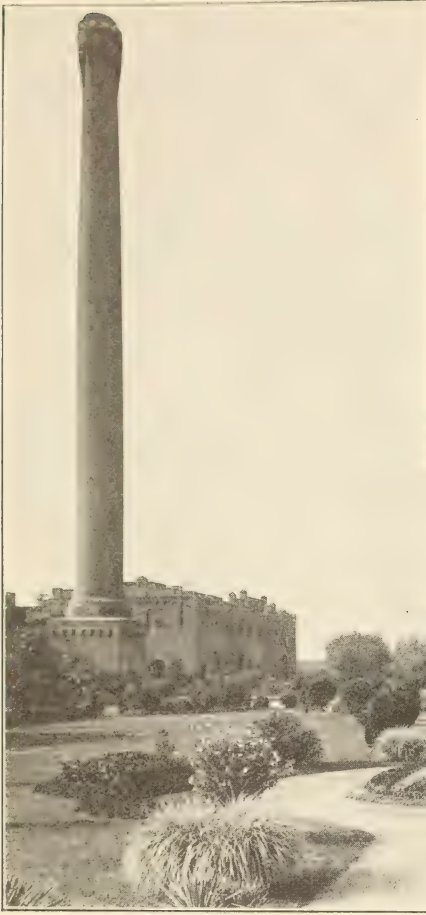
Your first impression of a water-works plant, like your first impression of an individual, is gained from appearances and may be favorable or unfavorable. The water plant does not exist or succeed that can afford to ignore public opinion. Without favorable opinion, it is almost impossible to make 100 per cent collections, difficult to enforce regulations, and useless to attempt the raising of funds for extensions or rehabilitation. Out of 6,000 water plants in the United States, it is a safe estimate that half of them have no ornamentation or artistic treatment of the grounds and the

appearance of them is such that public opinion is unfavorable.

About 80 per cent of all water expenditures are for wells, mains, conduits, services, meters, and other underground structures. Consequently, the buildings and grounds involve a relatively small expenditure in comparison with their importance from the standpoint of the visitor. The entire water plant is judged by the appearance of that part visible to the layman.

If the grounds are clean, well kept, artistic and pleasing to the eye, the whole plant instantly receives favorable approval. The money spent in beautification of the grounds is a wise expenditure and a good advertise-





A VIEW OF THE ATTRACTIVE GROUNDS OF THE ST. LOUIS, MO., WATER-WORKS

sisting of fountains, pools, shady paths and beautiful drives, making it one of the show places of the larger American cities. Rochester, N. Y., has in its water reservoir a fountain that adds to that city's fame and reputation and is long remembered by visitors. The ancient aqueducts with their graceful vine-covered arches were structures of beauty, but with the advent of pumping machinery and pipe lines in their places, we are not seeing as many pleasing water structures as formerly existed.

No one ever questions the wisdom of this expenditure for beautification. It pays for a small town as well as for a large city. It is good advertising and good business for

ment for the entire city, for cities are frequently judged by their water-supplies. The safety and purity of a water-supply are often estimated upon the basis of the external appearance of the reservoirs and surroundings. A feeling of security and health is assured when buildings and grounds are immaculate in appearance. Even the smallest plant can afford a few flower-beds, shrubbery and perhaps a little pool or fountain.

Some cities have either located their stations in city parks, or park departments have taken over the grounds as a part of the park work. South Bend, Ind., has its principal station in Riverdale Park, and the architecture of the building and the character of improvements are in keeping with the surroundings. The St. Louis water-works surroundings are very elaborate, con-

sisting of the superintendent, the mayor, the water board and the city, and it does the consulting engineer no harm to leave his job with an attractive appearance as well as an efficient works.

ACKNOWLEDGMENT.—From a paper read before the Southwestern Water Works Association Convention, Hot Springs, Ark., 1922.

### What Other City Councils Are Doing

THE Bureau of Statistics of the Municipal Reference Library of Chicago is doing a public service in issuing from time to time mimeographed sheets containing brief lists of references to ordinances introduced in or passed by city councils of cities other than Chicago. The fourth of these lists bears the date of January 2, 1923. Copies may be obtained from Frederick Rex, Municipal Reference Librarian, 1005 City Hall, Chicago, Ill.

# A Primer of City Planning Progress and Legislation

By Miriam I. Ross

Secretary, Division of Housing and Town Planning, Massachusetts Department of Public Welfare

THE first partial zoning ordinance in the United States was passed in Boston in 1898. This ordinance limited the heights of buildings in Copley Square and was followed by an act in 1904 dividing Boston into two districts—A and B. In district A, buildings were limited to a height of 125 feet, and in district B, to a height of 80 feet. The next partial zoning ordinance in the United States was passed in Los Angeles in 1909. This ordinance was retroactive in its provisions and has been upheld by the Supreme Court of California and by the Supreme Court of the United States. The only restriction was concerning the use of buildings, setting aside certain portions of the city for industrial districts, but keeping the rest residential. The first comprehensive zoning ordinance was adopted in New York in 1916.

Zoning is perhaps the most popular movement in the city planning field to-day. By regulating the height, area and use of buildings, zoning safeguards property values and insures protection of residential areas. Zoning is, however, but one of the forms of city planning work. A comprehensive city plan will embrace all the factors in the life of the city—public, semi-public and private. These factors include the street system and traffic regulation, the parking of vehicles, the transportation system, bridges and grade crossings, the provision of utilities, as water, gas and electricity, the sewerage system, the disposal of waste, the creation of parks, playgrounds and parkways, the development of waterways, the school system, lot subdivision, building lines, housing, regulation of billboards, and zoning.

## How City Planning Is Accomplished

The best city plan if it reaches only the stage of a network of lines on paper will be valueless. The city plan must be enforced in order to be felt in the life of the

community. And for its enforcement a city planning board or commission is formed. The movement was started in the United States by private initiative, the work of a chamber of commerce or improvement association or other similar body of citizens which did the experimental and preliminary work necessary before it was taken over by public authorities. In 1907 the first permanent city planning commission was appointed in Hartford, Conn.

In the laws under which city planning commissions operate, the commissions are instructed to make plans for the proper development of the community. The commission is usually made up of unpaid men—men who have made a special study of this subject, men who are public-spirited and active in community work, or men who are good organizers and can aid the commission in publicity work and in educating the community to the need of carrying out the city plan. Where possible, an expert city planner is made a member or a consultant of the commission. This expert may be an architect, a landscape architect, an engineer, or a lawyer who has given special study to the science of city planning.

A board may be composed of any number of members, though the city planning law of some states limits the membership to a certain number. In small communities three members may be enough, though from five to nine members make a good working group. A large board is apt to be unwieldy, hard to get together, and not quite so efficient as the smaller board. In cities it is customary for members to be appointed by the mayor, and in towns the commission is usually elected by the voters. It is most desirable that the members serve for long periods, so that the work may be interrupted as little as possible by changing membership. The terms of the members usually vary, overlapping, so that the terms do not end all at the same time. This is desirable,



as it insures, after the initial appointment has been made, that the majority of the commission shall be experienced.

### Three-fold Nature of the Work

The work of the city planning commission is three-fold—planning, advising, and selling the plan.

First, the plan must be made, and as a primary step a survey and map of the city should be made to show existing conditions. For it is usually true that city planning must of necessity mean city replanning, in the older portions of the city at least. Occasionally a new development is planned from the start, but more often the problem is to use the best of what exists in a community, adding to it and making changes where necessary.

The function of a commission is mainly advisory. It is not intended or desired that the planning commission shall supplant in any way the organized departments of local governments, but that it shall pull departments together, planning for the whole community and acting as advisor to the boards already functioning. It is seldom that a law gives a planning commission power to carry out its own plans; and this is wise, for as soon as a planning commission becomes burdened with the details of construction, its usefulness as a body that can take a long look ahead and study future needs is impaired.

An important part of the work of the planning commission is getting the plan accepted and carried out. This entails educational work—publicity through the press, through lectures, exhibitions, motion pictures, schools, churches, libraries. The important thing is to get the plan before the people in graphic form, showing as dramatically as possible what advantages the plan will bring if carried out, showing also what failure to plan will mean in the future life of the community. The governing body of the community must be convinced that the people are favorable. If that can be done and the pressure of the voters is felt, the plan is more likely to be accepted and much more likely to be a living thing after its acceptance. It is not enough that the plan be accepted. It must be carried out, and not laid away and forgotten after acceptance. It is customary for the planning commission to have no power to enforce the plan it produces. This usually works out

well. The test of the plan is its reception by the community which has been educated to consider it. A poor plan should be rejected. A good plan, backed by convincing arguments and given publicity of the right sort, will stand a fair chance of being accepted, and the community, in studying the question of its acceptance, will be educated to a better citizenship.

### State Laws

Of our 48 states, 21 have no state-wide law on city planning. A few of these 21 states have cities with planning commissions, as, for instance, Memphis, Tenn., and Fargo, N. Dak. In Maryland, Baltimore has a city zoning ordinance, while bills to provide for the establishment of city plan commissions and for zoning were submitted to the 1922 Legislature but failed to pass. The state of Washington reports that public-spirited men in Spokane and Seattle are planning to submit a bill to the next Legislature. Of the remaining 27 states, 20 have laws authorizing or requiring the establishment of planning commissions, and 26 states and the District of Columbia have partial or comprehensive zoning enabling acts.

The following table lists the state laws on zoning and city planning:

STATE	Zoning	City Planning
California .....	1917	1915
Connecticut (1 city).....	1921	1919
Georgia (1 city).....	1921	....
Illinois .....	1921	1921
Indiana .....	1921	1921
Iowa .....	1919	....
Kansas .....	1921	1921
Kentucky* .....	....	1922
Massachusetts .....	1920	**1913
Michigan .....	1921	1921
Minnesota .....	1921	1919
Missouri .....	1921	....
Nebraska .....	1919	1921
Nevada* .....	....	1920-21
New Jersey .....	1920, 1921	1913, 1916
New York .....	1921	1913
North Carolina*.....	....	1921
Ohio* .....	....	1915
Oregon .....	1919	1919
Pennsylvania .....	1919, 1921	1911, 1913
Rhode Island.....	1921	....
South Carolina.....	....	1920
Tennessee .....	1921	....
Texas .....	1921	....
Vermont* .....	....	1921
Virginia .....	1922	....
Wisconsin .....	1917	1917

\* Grants zoning powers to planning commissions.

\*\* Amended 1914.

The zoning acts of the various states differ in details. The purpose of all the acts is the same—the safeguarding of health and property values by permitting regulation by districts of height, area, and use of buildings. Zoning regulations differ in

different districts, but are the same for all districts of the same type.

Laws governing the establishment of planning commissions in states are mainly permissive laws. The Massachusetts law is mandatory for cities and for towns of over 10,000 population, permissive for smaller towns. Usually the law states that no member of the commission, or only the secretary, shall receive compensation for his work.

### State Departments

State departments exist in three states—California, Massachusetts and Pennsylvania.

The California department is the Commission of Immigration and Housing, established in 1913. In addition to its duties in connection with the Americanization of the immigrant, the Commission is instructed "in cooperation with the proper authorities and organizations" to "encourage the establishment of playgrounds and other recreational activities, and also the establishment of settlements and social centers in cities and towns"; also "to investigate housing conditions under which immigrants live" and, finally,

"The commission may make investigations of the housing of immigrants and working people and of city planning in California and elsewhere, may encourage the creation of local city planning commissions and may furnish information as to the progress of other cities for the use of such commissions. It may investigate and report upon defective housing and the evils resulting therefrom and the work being done to remedy the same in California and elsewhere. It may make studies of the operation and enforcement of building and tenement house laws, of housing finances and taxes, of zoning and districting regulations and may promote the formation of organizations intended to increase the supply of wholesome homes for the people, and aid in the enforcement of any laws enacted to promote the purposes for which the commission is established."

Every planning commission is required to report to the state department, and the department is authorized to aid the commissions with information and suggestions.

The Department of Public Welfare in Massachusetts carries on the work of the Homestead Commission created in 1911 and abolished in 1919. Its duties, in so far as they relate to the subject of city planning, are as follows:

"The commissioner and board shall investigate defective housing, the evils resulting therefrom and the work being done in the commonwealth and elsewhere to remedy them, study

the operation of building laws and laws relating to tenement houses, encourage the creation of local planning boards, and promote the formation of organizations intended to increase the number of wholesome homes for the people."

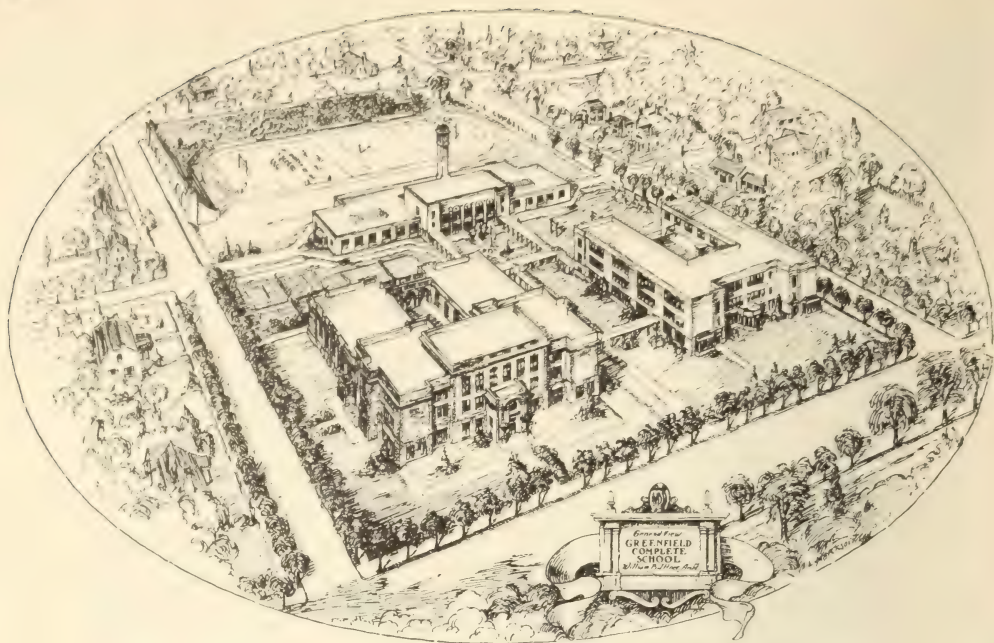
Special power is given, subject to the consent of the Governor and Council, to provide homesteads for citizens with public funds. Like the California department, it is required to cooperate with local governments and boards.

The Pennsylvania department was established in 1919 as the Bureau of Municipalities in the Department of Internal Affairs. The text of the act as it relates to planning commissions follows:

"The said bureau shall gather, classify, index, make available, and disseminate data, statistical information, and advice, . . . in order to promote a comprehensive plan or series of plans for the probable future requirements of cities, boroughs, or townships of the commonwealth, either separately or jointly, in respect to a system of traffic thoroughfares and other highways or main highways, transportation of every sort, suitably coordinated sites for public buildings, parks, parkways, playgrounds, and other public uses, the preservation of natural and historic features, and any and all public improvements tending to the advantage of the municipalities or townships affected, tending to their advantage as a place of business and residence, and to either make or secure or assist in making or securing the necessary surveys, plans, and information."

Since the first partial zoning act was passed 24 years ago, state-wide laws permitting city planning commissions or zoning have been passed in 27 states, 3 more than one-half the total number of states in the Union. The year 1921 saw the greatest number of zoning acts passed, as 16 of the 26 acts were accepted in that year. The city planning laws were more scattered over the whole period, although the largest number passed in any one year, eight, found acceptance in 1921. The burden of pioneering work, proving the value of city planning, has fallen to six states—California, Massachusetts, New Jersey, New York, Ohio, and Pennsylvania. Their laws were all passed by 1915, Wisconsin following in 1917, and Oregon, Connecticut and Minnesota in 1919. While it is possible for isolated cities to get city planning legislation as they are ready for it, state-wide laws are desirable for every state. State departments, also, although they exist in three states only, are especially useful in coordinating and encouraging the work of local commissions.





THE COMPLETE SCHOOL PLANT DESIGNED FOR GREENFIELD, OHIO

## School Building in Small Cities

By William B. Ittner

Architect and School Specialist, St. Louis, Mo.

IT is estimated that approximately half the total school enrollments of the country are distributed among the smaller cities. A careful study and the evolution of a sane solution to school-building problems of the smaller centers of population are therefore important and significant.

In the matter of general educational procedure, as well as school building progress, small cities enjoy several advantages over large cities:

1. There are usually less complicated political situations.
2. Parents and friends of education are in closer touch with the life of the schools.
3. Public interest in the needs and welfare of children is more quickly and keenly aroused.
4. Educational reform can be instituted more rapidly in the smaller cities, since less time is required to overcome tradition and inertia and to turn the wheels of the machinery into a new channel.
5. A regular school architectural department is not required, so there is abundant opportunity and freedom to call in the best school-building talent of the community at any time desired.

The fundamental in the solution of school-building problems in small cities, as well as in large ones, is centralization; to be more specific, the development of a restricted number of small segregated units. Educational expansion, the enrichment of the school plant, and sane economies can never be realized with a number of pure classroom schools that spring up from time to time to supply only immediate needs.

The need for centralization developed with the demand for an enriched curriculum. When school life became real living, the "1873 variety" of school building and equipment would not do. When gymnasiums, playgrounds, showers, auditoriums and workshops became essentials instead of luxuries, financial pressure compelled the consolidation of sites and buildings.

For cities of 5,000 to 8,000 inhabitants a single centralized unit for all grades should be sufficient. If the location is in proximity to the geographical center, distances should not be a matter of concern

unless the topography or general city plan is unusual. When schools are equipped with cafeterias, a half-mile of travel morning and evening for a few on the outskirts ought not to occasion hardships.

For cities with a population between 8,000 and 15,000, two units for all grades would be required. These would need to be properly zoned in order to equalize distances.

For cities with a population between 15,000 and 25,000, three complete units would be sufficient, or a different type of centralization could be adopted, namely, two elementary schools, including kindergartens, and one Junior-Senior plant, located in proper relation to the elementary units. With a total school enrollment of 4,000 or 5,000 pupils, two elementary schools, each with an approximate enrollment of 1,500 to 1,800 pupils, and a centrally located Junior-Senior plant, including 1,000 to 1,500 students, ought to insure educational efficiency and economy.

Objections have been raised to the complete school plants, including all grades, on account of the intermingling of high-school students with small children. The objections, however, have been founded on opinion rather than on fact. Our best private schools do not represent segregation of the older and the younger students in separate schools; they represent complete units. Segregation originated with the public school and has become traditional with it. It is reasonable to believe that since life is a continuous process, education should be likewise. There are no ostensible abrupt breaks in nature's development; then why in the educational procedure?

The Junior-Senior organization may also exist in a complete plant, as well as in the segregated one, if it is desired. There would naturally be a distinction between the upper six grades and the lower ones. But a complete separation would not follow, as in the segregated plant. Facilities such as playgrounds, gymnasiums, showers, pools, workshops and auditoriums could be used in common, thus giving continuous and maximum use to all educational quarters, and a rich educational environment to all pupils.

### **The School Plant in Greenfield, Ohio**

Among the several small cities that have changed their building and educational plan-

icy so that all the children may enjoy equal educational advantages is Greenfield, Ohio, a small city with a population between five and six thousand. It is located in the heart of a rich agricultural community, but has also several thriving industrial enterprises. The city therefore includes the characteristics of the industrial as well as the non-industrial community.

Among the citizens of Greenfield is E. L. McClain, who has developed an unusual industry there. Several years ago Mr. McClain presented a practical gift to the city, a high school on a centrally located site. Though it is a medium-sized school, having an operating capacity of less than 700, it is unusually fine in efficiency of plan, rich facilities, beauty and substantial construction.

The building occupies a commanding setting on a four-acre site which gives complete parking and athletic field areas. It is three stories in height and is executed in brick with Indiana limestone trim. The corridors of the school and its library are veritable art museums with their mural decorations and careful selection of casts and paintings. That the rich working facilities have appealed to the young people of the community is evidenced by the fact that the high school enrollment has practically doubled during the eight years the school has been in operation. Parents in a number of the surrounding districts have voted their tax-duplicates to Greenfield, and a regular auto transportation for students has been instituted. It is indeed no wonder that the well-equipped gymnasiums, shower-baths and athletic facilities, the workshops and laboratories, and the elevating and ennobling atmosphere of the whole environment should make a striking appeal. And that the citizens are proud of it is evidenced by the community uses of its medium-sized but attractive auditorium. This is equipped completely, even with a pipe-organ, and has a direct community entrance.

The elementary school children have also been beneficiaries, first by their admission to the uses of the gymnasium and auditorium, and latterly by the school's service as a stimulus to the right kind of elementary plant. The most interesting fact about Greenfield is that although school progress was initiated by the McClain High School, progress did not stop there.





THE McCLAIN HIGH SCHOOL, GREENFIELD, OHIO

Built and equipped at a (pre-war) cost of \$250,000, this building constituted the stimulus to the centralization plan now being developed

### The Elementary School

Fortunately, the principal elementary school of the city was located on its own restricted site immediately adjacent to the new High School. It was essentially of the "1873 variety," and its location served to emphasize and even to exaggerate its gruesomeness, barrenness and awkwardness to such an extent that the citizens finally concluded they could stand it no longer. Their self-respect came to their rescue and demands were made for a new elementary school. Mr. McClain added further impetus to the good resolutions by his decision to double the ground space and add a detached annex containing a swimming pool, agricultural laboratories, cafeterias, and more shops, to be used by all children. The completed project was to include on a site of 9 acres the original McClain High School, the new Elementary Unit and the Annex. The three detached buildings were to be connected by covered pergolas.

The new Elementary School will include as rich a working environment as the High School. But it will not need an auditorium, a pool, a circulating library and certain workshops, for those provided for the High School will serve all the children. Its regular use will be restricted to the first six grades and kindergartens, since the type of organization changed with the reformed building policy to what is technically known as the 6-6 plan. The upper six grades will

use the High School and Annex, and the lower six grades the Elementary School and Annex. The ground space will be apportioned for common use, as well as for individual use by the two schools.

In order to determine the size of its proposed Elementary School plant and the new Annex, the architect was requested by the Board and Superintendent to make the necessary survey of needs, both housing and educational. In this respect Greenfield established a wise precedent. Such study ought to constitute a prerequisite to the development of all building programs. It will automatically eliminate the altogether too frequent practise of building only for immediate needs, a policy which results in both inefficiency and waste.

The housing survey included an investigation of the past, present and estimated future growth of the community, and the educational survey the dominant educational policies, analysis of the curriculum, study of the organization, and the development of type of buildings most serviceable to the housing and educational requirements. The survey also included an analysis of comparative costs.

### An Efficient, Economical Plant

September, 1923, will see the new consolidated group in operation, with approximately 1,600 children. Its cost, completed, will approximate \$700,000 for the two new

buildings and the additional ground, a cost which, compared with the requisite number of scattered elementary schools, represents true economy. It was estimated that three small elementary schools, each appropriating a block of city property, would be required to take the place of the one consolidated elementary school unit. Approximately \$1,000,000 would be required for the three segregated units and then there would be no provision for physical education, the out-of-door space would be insufficient, and there would always be lack of special quarters.

The Greenfield plan of concentrating its educational machinery in a central location, the foresight in the selection of an adequate site, and the planning of a plant where the principles of democracy can actually be set in motion through practise, and not merely taught, is undoubtedly a distinct departure in school building for most American small cities. Yet it represents what every small city can and ought to do if efficiency and economy are simultaneously desired.

The ultimate capacity of the Greenfield plant is 2,000 students. The original cost of the McClain School (pre-war) is \$250,000. The total cost of the entire group is \$950,000, equipped, which yields a per capita cost of \$475.

Even before the ultimate capacity of the present plant is reached, plans for the second unit will be initiated. In fact, the housing survey indicates that the future site should be procured immediately. And it may be that the trend of growth will be such as to suggest the beginnings of two new units. When the two new units are developed into completed plants, the pres-

ent group could form the Junior-Senior plant and the other two the elementary, if the tendency should favor this type of centralization. It is not recommended, however, until Greenfield has a school enrollment of at least 5,000 students and a city population of approximately \$25,000. The planning and construction in the present consolidated plant represent the height of elasticity, and alterations to fit it to Junior-Senior purposes will be simple and inexpensive.

There is an intimate connection between the building plan and the educational program of a school. The educational program and the operating device must always be determined in advance. The importance of employing an expert in school planning, one who is able to interpret the educational program in terms of the building plan, is now being realized. Although the cost of securing the services of an expert may be greater than the charges of the inexperienced, the resulting efficiency of the plant will indicate its real economy.

There are two methods of employing an architect—(1) competition, (2) direct selection. Competition to determine a selection should be conducted under the program formulated by the American Institute of Architects. But the competition can determine only architectural ability. Both executive ability and a knowledge of schools are required to carry out a successful school building program. Direct selection, therefore, of an architect who has proved his fitness to handle school buildings is by far the more satisfactory method—in fact, the only method that will insure building service to communities.

## The Small Cost of a Municipal Music Week

According to the records of the National Bureau for the Advancement of Music, 94 cities have held city-wide observances of Music Week, and many such are being planned for the late winter and the early spring. It is a striking fact that the expense involved in these extensive celebrations is relatively small. In most cities of less than 50,000 population the outlay of the central committee was under \$200. In Birmingham, Ala., it was \$500; in Sacra-

mento, Calif., \$300; in Seattle, Wash., \$490. Even in San Francisco, where many special features were included, the expenditure was only \$3,600, nearly half of which was contributed from the city treasury. Most of the participation is on a volunteer basis by organizations, groups and individuals desirous of doing something for the musical progress of their city. There is a strong sentiment for a National Music Week beginning in 1924 and held annually.



# Forward Steps in Municipal Affairs

## Police Departments

### "Appealing from Philip Drunk to Philip Sober"

DES MOINES, IOWA.—In December last, the Department of Police of Des Moines issued an order to take effect January 1, 1923, to the effect that all prisoners brought into the police station charged with intoxication be photographed while in their intoxicated condition and that a copy of the photograph be delivered to the prisoner on his release. On the back of the photograph is printed: "Take a look at this before taking another drink."

As an inducement for the prisoner to preserve his photograph, the following information also appears:

"If you are not returned to the station charged with intoxication within ninety days from the date of your present arrest, you may present this photograph to the Superintendent of Identification and the negative will be destroyed in your presence."

I keep an alphabetical list of all prisoners arrested for intoxication, and during my nine months in office I have found a number of old "drunks" who appear every few days. Some of these have as many as thirty convictions listed. Sometimes a released prisoner will be returned the same day he is released, charged with intoxication. The usual sentence in such cases is three days in jail.

One week is not a fair test of my theory, but in this week (the first week in January) not one photographed old "drunk" has returned. I expect, however, to get more results with men whose self-respect is not nearly so obliterated as is that of the old inebriate. An experiment of at least ninety days should either show the value of the theory or demonstrate its futility.

I have another system of curing inebriacy with which I have experimented for some time on a small scale, and which I may enlarge upon at an early day—and which justifies the hope for permanent results in curing drunkenness. This experiment covers a period of three years with several different classes of individuals.

As a first step, I find who is the most loved friend of the victim; it may be a wife, mother, father, sister, sweetheart or some benefactor. As soon as I determine who the loved one is, I write a letter addressed to this person, as follows:

"Dear Friend:

"I am writing you this letter to acknowledge my obligations to you. I realize the many kindnesses you have done me and mine. I also realize the worry and trouble, pain and humiliation I have given you in return for those kindnesses and that these acts of mine are due to liquor. My acts, while intoxicated, have caused you to be ashamed many times."

"I realize all this, and now, while I am perfectly sober and in my right mind, I will again abuse your confidence and run my hand through your heart-strings by taking a drink of the stuff that I know damns me and the innocent ones who love me. I do this deliberately and without cause, save that of being a 'good fellow' with other bums with whom I associate. I take this one drink knowing that it will call for a hundred more. I start on this debauch deliberately. I am unworthy of your love or friendship and repudiate both. A drunken debauch for me.

Your faithful friend,  
\_\_\_\_\_."

This letter I enclose in a stamped envelope addressed to the friend of the "drunk," and enclose this in a larger envelope to preserve it. I then approach my inebriate friend and tell him that I will not ask him to quit drinking, but that I will ask him to carry this letter in his pocket and promise me that, before he takes another drink, he will read the letter, sign it and mail it to his friend. I always get this promise. I know of none who have mailed the letter nor abused the promise made to me.

A few days ago, a smiling, half-ashamed face appeared in my office. It was the first man to whom I gave such a letter. I had not seen him for three years. He looked prosperous. I did not recognize him. He pulled an old, worn-out letter from his in-

side pocket, handed it to me and asked if I would renew it. He told me he was tempted to drink many times, and some times under embarrassing circumstances to refuse, but that he always thought of his letter and it helped him to get past the danger place.

It appears to me that it is one of the first duties of an officer and of a citizen to help his weaker brother to get by the "danger places."

JOHN B. HAMMOND,  
Chief of Police.

## Mayors

### A Sight-Seeing Demonstration of Municipal Projects

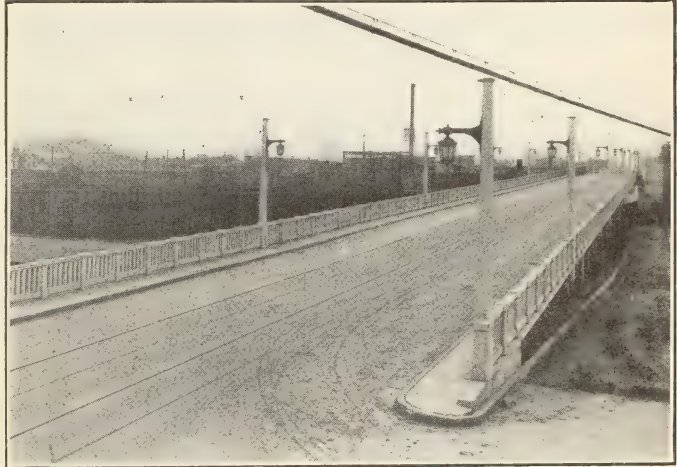
MEMPHIS, TENN.—The city of Memphis has undertaken several municipal projects of more or less magnitude. In order that these improvements and the need thereof might be understood, the writer recently arranged a sight-seeing tour, inviting the directors of the Chamber of Commerce and a number of prominent citizens to join us in occupying two large busses engaged for the occasion.

The thought prompting this tour was the lack of information upon the part of the general public as to the particular objects for which bond issues and other municipal funds are expended. For instance, at the last session of the Legislature, a City Planning Commission was

legally created. It employed a competent city plan engineer, whose first duty was the preparation of a major and a minor street program. Proper authority was obtained for the issuance of bonds to carry out certain improvement projects recommended by the City Planning Commission, upon the advice of its engineer, such as the widening of existing streets and the opening of new streets, with a view to providing additional thoroughfares to carry the heavily increasing auto traffic.

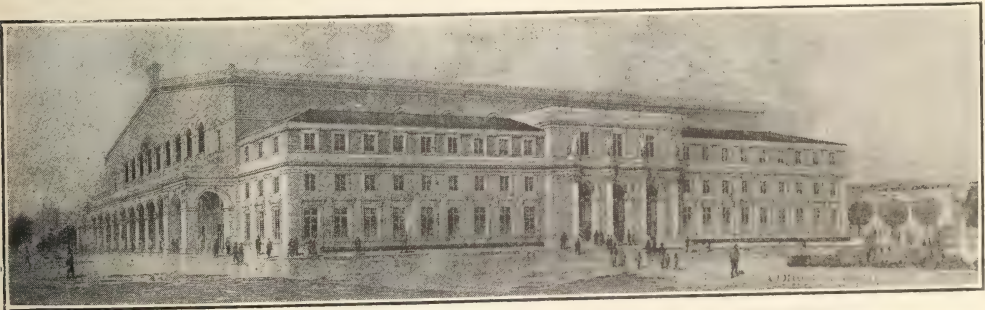
The city is engaged in building a municipal auditorium, to cost \$1,500,000, with a seating capacity of twelve to fourteen thousand, half of the cost to be shared by the county of Shelby. The reconstruction of our water-works system is also under way, at an expenditure of \$2,000,000.

Through the Park Board, the city has recently purchased several playgrounds and



NEW VIADUCT OVER ILLINOIS CENTRAL TRACKS,  
MEMPHIS, TENN.

recreation centers, which are being developed, one of these containing an open-air swimming pool capable of taking care of



MUNICIPAL AUDITORIUM UNDER CONSTRUCTION IN MEMPHIS



3,000 people at one time. The city has also provided several commodious buildings which are used principally in connection with an annual fair. Between times these buildings are used for indoor sports of various kinds.

A long viaduct has just been completed, spanning the Illinois Central Railroad tracks and furnishing a large industrial section of the city with free and easy access to the residence section. The lighting fixtures on this viaduct were furnished by the Westinghouse Electric and Manufacturing Company.

The city is spending \$1,000,000 for the building of river terminals, to which the Federal Government has added \$450,000. These terminals are to be used for providing the Federal Barge Line with loading and unloading facilities. At the same time, the terminals are available to any other agency operating barges on the Mississippi River. These terminals will be used principally in connection with shipments moving in large tonnage, affording primarily an interchange between river and rail transportation.

The city is engaged in extending its school facilities by spending \$2,000,000 in putting up new buildings, including a high school to seat 1,000 pupils.

All these major improvements, together with a number of minor ones, were shown this group of business men, that they might understand how the municipal funds are being invested. The trip proved very beneficial.

ROWLETT PAINE,  
Mayor.

## Departments of Education

### A Junior College Loan Fund

JOLIET, ILL.—During the last few years in our Junior College, we have developed what is known as the Joliet Junior College Loan Fund, the purpose of which is to assist students of marked ability who wish to complete their college and professional education but who have limited resources. The demands upon it have become so great that citizens of Joliet have taken it up and strengthened it by voluntary contributions. The help given to the recipient does not take the form of charity, nor does it pauperize his spirit. His character and

past achievements are investigated and, if he is worthy, he is given the requisite assistance.

Money is loaned in amounts varying from \$50 to \$500 per year according to the needs of the student during the time he is completing his college course. The loan is without interest while the student is in college. The day he graduates, the loan begins to draw 5 per cent interest until paid.

L. W. SMITH,  
Superintendent, Joliet Junior College.

## City Planning Commissions

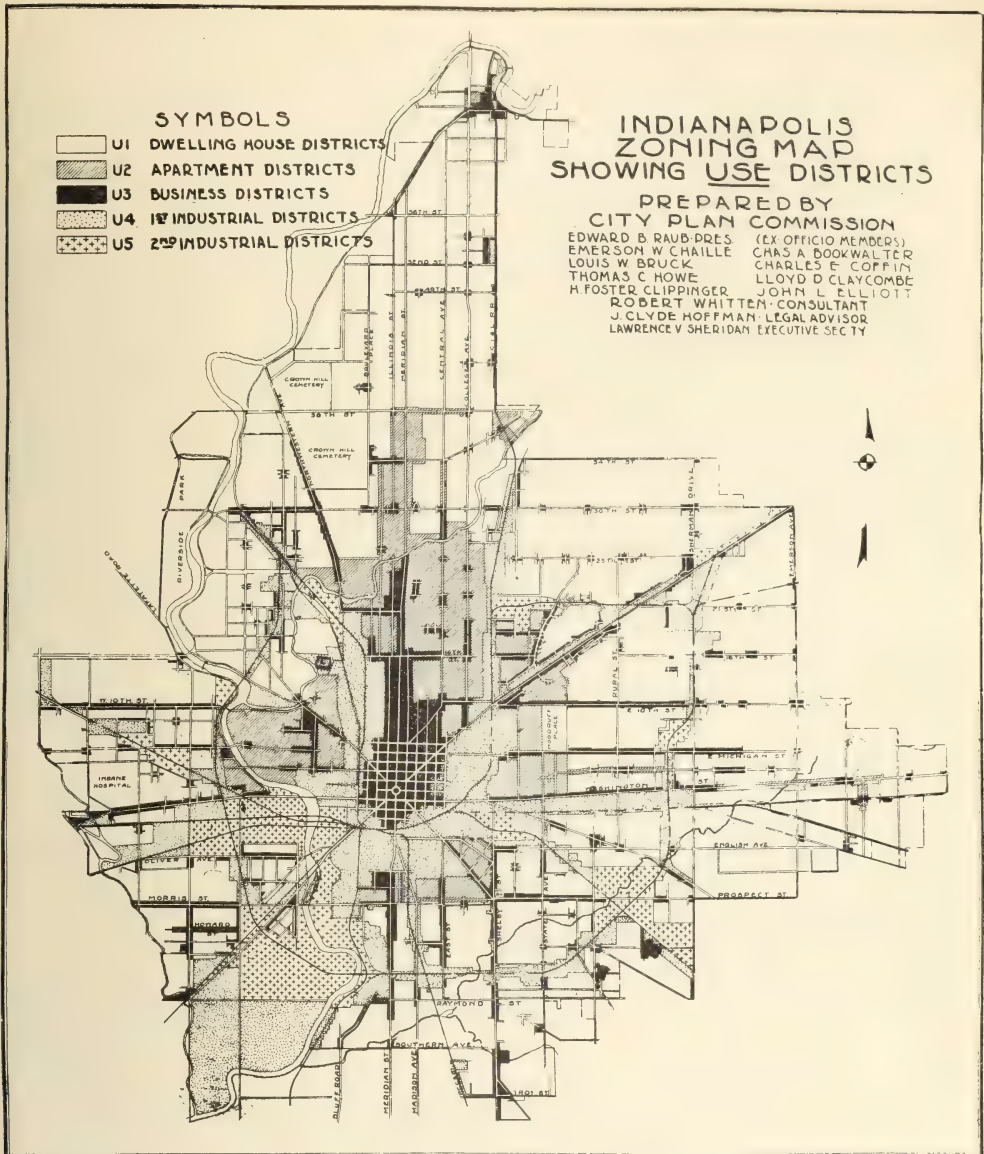
### Indianapolis Adopts Zoning

INDIANAPOLIS, IND.—On December 20 the zoning ordinance of Indianapolis went into effect, having been adopted a month previously by a unanimous vote of the Council. This is the first zoning ordinance to be adopted by any Indiana city under the authority of the state enabling act of 1921.

The use districts established are: (1) dwelling-house; (2) apartment house; (3) business; (4) first industrial, and (5) second industrial.

The area requirements are designed to spread out the population, prevent congestion, and promote a detached house development. A lot area of 7,500 square feet per family is required in a limited section; 4,800 square feet per family in the less developed areas around the borders of the city; and 2,400 square feet, or two families to the ordinary 40 by 120-foot lot, throughout the rest of the dwelling-house areas. In much of the area in which apartment houses are permitted, 1,200 square feet per family is required; in limited portions of the apartment house districts only 600 square feet per family is required; and in very limited areas suitable for hotels and elevator apartments, there is no limit as to the number of families that may be housed on a given area. Front, rear and side yards are required in all residence districts.

In the height district allowing maximum height, the limit is 180 feet, except that for a street 100 feet or more in width the limit is 200 feet. As practically all the streets in this district are 90 feet in width, the limit is really based on twice the street width. Washington Street, with a width of 120 feet, is the only street where the 200-



ACCOMPANYING THE INDIANAPOLIS ZONING ORDINANCE ARE THREE LARGE MAPS OF THE CITY, ONE OF WHICH IS REPRODUCED ABOVE. THE OTHER TWO SHOW THE AREA REQUIREMENTS AND THE HEIGHT LIMITATIONS

foot height will be allowed at the street line. Greater height will be permitted with a setback in the ratio 1 to 3; but this setback must be from all lot lines as well as from street lines. The City Plan Commission first recommended a height limit of 150 feet, but later agreed to the 180-foot limit as a compromise with the down-town property owners who asked for the retention of then existing limit of 200 feet.

Work on the zone plan was begun by the City Plan Commission in January, 1922, with Robert Whitten, of Cleveland, as consultant. A careful zoning survey was made and many conferences were held before the ordinance was finally submitted to the Council. The zoning ordinance had the active support of the Chamber of Commerce, the Real Estate Board and other civic bodies.

LAWRENCE V. SHERIDAN,  
Secretary and Engineer, City Plan Commission.



## Official Recognition of Pittsburgh's Citizens Committee on City Plan

PITTSBURGH, PA.—“A great event in the life of Pittsburgh” is the *Pittsburgh Post's* designation of the forward step taken by the City Council of Pittsburgh in December in recognizing officially the Major Street Plan and the Playground Plans of the Citizens Committee on City Plan of Pittsburgh, and agreeing to work towards those plans in future improvements. And the *Pittsburgh Sun* states editorially that the City Council by this action “has affirmed the first and only far-reaching Pittsburgh program of civic growth.”

Two resolutions were adopted by the City Council on December 11. The one covering the Major Street Plan reads as follows:

*Whereas*, The Citizens Committee on City Plan of Pittsburgh has made a detailed study of the main thoroughfares, or so-called major streets of the city of Pittsburgh, and has formulated and published a Major Street Plan, consisting of an organized system of thoroughfares for traffic circulation; and

*Whereas*, This Major Street Plan was based upon all available data as to present and future needs of the city and is recognized to be a thorough study of the principal streets of the city; and

*Whereas*, This Major Street Plan has been highly commended by the Department of Public Works and the Department of City Planning of the city of Pittsburgh, and has met with the general approval of civic organizations and individual citizens throughout the city;

*Now Therefore Be It Resolved*, That the Major Street Plan of the Citizens Committee on City Plan, dated September, 1921, be filed with the Department of City Planning and the Department of Public Works and that these departments, the officials and engineers of the city be instructed to take said Major Street Plan into consideration in the planning, development and improvement of the main thoroughfares of the city, and, in all recommendations and reports to Council with reference to the planning, development and improvement of such streets of the city, to cite and discuss the recommendations of said Major Street Plan in connection therewith.

A similar resolution was adopted with reference to the committee's plan for the development of playgrounds and athletic centers.

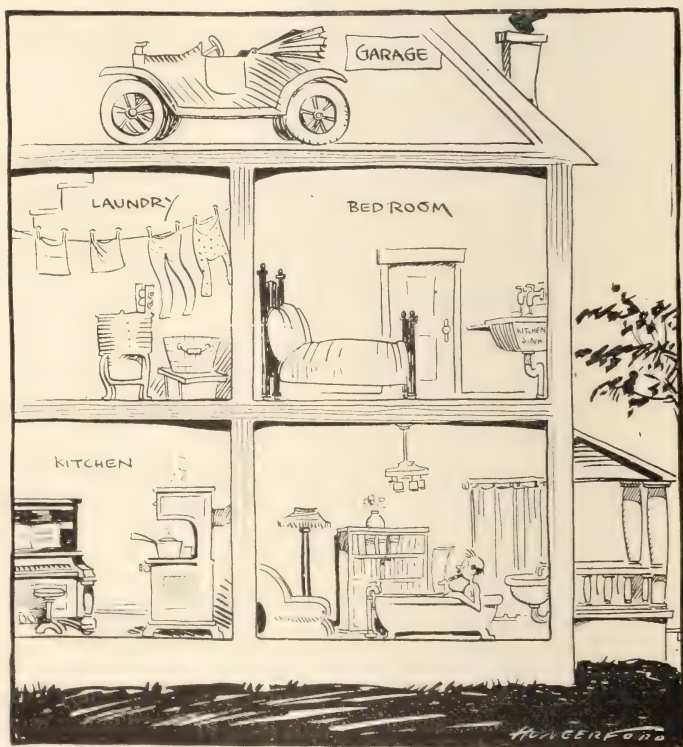
The Pittsburgh Plan, it is expected, will be complete some time during the spring of 1923. Subcommittees are now

completing their studies, and will soon present detailed recommendations as to how the city may meet its needs in the way of rail and river transportation, transit, and parks.

GEORGE KETCHUM,  
Executive Secretary, Citizens Committee on City Plan of Pittsburgh.

## Fun and Crime

In retracing the tortuous path of the youthful criminal, it is seldom found that the trail leads back to the playground, the diamond, the athletic field or the community center. In investigating crime, with especial reference to the work conducted by the Chicago Crime Commission, I have been impressed with the fact that a very large percentage of those apprehended have been strangers to the influences exerted by such activities as those mentioned. The young delinquent has, in the majority of instances, grown up in the atmosphere of the saloon, the poolroom and similar hangouts.—HENRY B. CHAMBERLAIN, *Operating Director, Chicago Crime Commission.*



THE SORT OF HOMES WE SHOULD HAVE IF OUR HOUSES WERE LIKE OUR CITIES

A cartoon used by the Citizens Committee on City Plan, of Pittsburgh, in its campaign of cooperation with the official City Planning Commission, for the enactment of a zoning ordinance by the City Council

# The Construction and Operation of the Sewage Pumping Station at Schenectady, New York

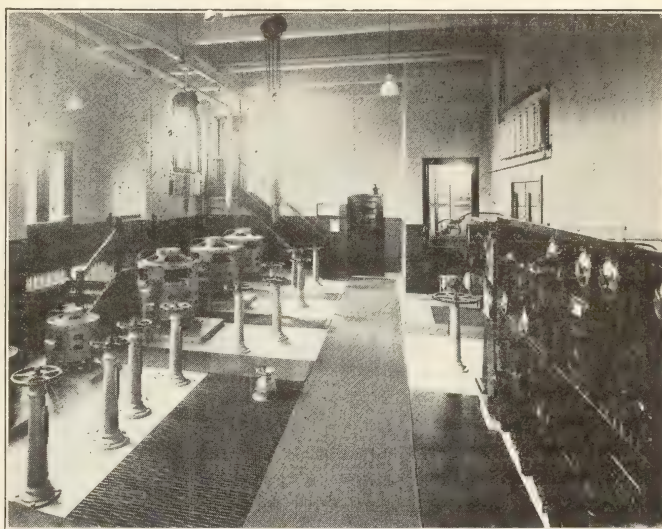
By John V. Lewis

Superintendent, Bureau of Sewage Disposal, Schenectady, N. Y.

**W**HEN, in 1913, the city of Schenectady prepared plans for additions to its sanitary sewerage system and for the installation of a sewage treatment plant, three methods of bringing the sewage flow to the plant were considered. These were: (1) a gravity intercepting and outfall sewer system; (2) a high and low level intercepting and outfall sewer system with pumpage of the sewage of the low level system; and (3) a gravity intercepting and outfall sewer system for which all of the sewage flow would have to be pumped at the treatment plant.

Owing to the topography of the city, the first plan could not be carried out, and of the latter two plans, the second seemed to best fit both the present and immediate future needs of the city. Accordingly, plans were prepared for the installation of a sewage pumping station and the low level sewerage system was so designed that the sewage flow of the eighth, ninth, and tenth wards and the General Electric Company plant would be brought to the station by a 36-inch interceptor, and the sewage flow of the first ward by a 15-inch interceptor. The sewage flow was approximately that contributed by a population of 30,000 persons and was estimated as about 4,800,000 gallons per day, including that of a day population of about 18,000 persons at the General Electric Company plant.

The site selected for the location of the pumping-station was at the foot of North



INTERIOR OF SEWAGE PUMPING STATION, SCHENECTADY, SHOWING MOTORS AT LEFT AND SWITCHBOARD AT RIGHT

Ferry Street and adjacent to the Mohawk River. At this point was located the abandoned water pumping-station which from 1871 to 1897 supplied the city with water from the Mohawk River. In the construction of the new station, it was necessary to tear down and remove the old water pumping-station. Subsequently the city purchased the properties on either side of the new station and bordering the river, and added the land to its park system. The station, therefore, stands in the center of what is now known as Riverside Park.

## The Substructure

The substructure is rectangular in plan, 63 feet in length by 35 feet in width, and is constructed of reinforced concrete. It contains two wet wells or suction pits, a dry well or pump room, and a transformer pit.

The wet wells are placed in line along



the river side of the substructure and are interconnected by a 24-inch sluice-gate set in the division wall. The 36-inch interceptor enters the substructure at its west end and is connected to the larger of the wet wells, while the 15-inch interceptor enters at the east end and is connected to the smaller wet well. A stationary rack, whose upper end rests against a raking platform, is provided at the inlet end of each well. The racks are constructed of 2-inch by  $\frac{3}{8}$ -inch iron bars, so spaced as to give  $1\frac{1}{2}$ -inch clear opening between bars, and are set 60 degrees with the horizontal.

The dry well which contains the pumps is rectangular in plan, 40 feet in length by 16 feet in width, and parallels the wet wells. The pumps are placed in line along one side of the dry well, and on the opposite side is located the 30-inch cast iron force main to which the pumps are connected and which leads up North Ferry Street for a distance of 550 feet and connects with the Front Street gravity interceptor.

The transformer pit is placed at the Ferry Street end of the substructure, slightly above and between the dry well and the small wet well. It contains the power transformers for reducing the line voltage from 2,300 volts to 244 volts.

#### The Superstructure

The superstructure was designed by the Bureau of Engineering with the idea of providing not only a structure to house the pumping units but to please the eye as well. It consists of a first floor or lower half of massive construction and a second floor or upper half of light, open construction.

The lower half is constructed of reinforced concrete overlaid with stucco. The entrances are a combination of Indiana and artificial limestone. All copings are composed of genuine limestone and all visible roof surfaces overlaid with Spanish tile. Tapestry brick trim is placed around the window openings and elsewhere, and the appearance of the superstructure is further enhanced by the addition of an ornamental belt cornice of wood and Spanish tile. The window openings are located above the flood stage in the Mohawk River, and during such periods the door openings are closed with wooden bulkheads.

The upper half is constructed in the form of a parapet wall with a stone coping.

Ornamental wooden columns support the frame roof, and false rafters project beyond the roof proper to give a pergola effect.

The first floor is divided into a large motor room, a screen pit room, and a boiler and coal storage room for the steam heating system. The office and toilet rooms are placed on a mezzanine floor directly over the heating plant. Access to the entrances and mezzanine and second floors is furnished by means of ornamental iron stairways.

The motor room contains the prime movers of the pumping units, the power and lighting control switchboard, an air compressor for furnishing air for cleaning purposes, a sump pump for emptying the sump in the pump room, and the instruments for recording the quantity of sewage pumped and the level of the sewage in the suction pits. Both the interior of the motor room and the machinery therein have been painted in such a way as to give them a very pleasing appearance.

For several years after the station went into operation, the large space on the second floor was not utilized. Then it was decided to equip it as a baby welfare station under the direction of the Bureau of Health. From June to September the station is open for the convenience of the poor mothers of the neighborhood.

#### The Pumping Units and Appurtenances

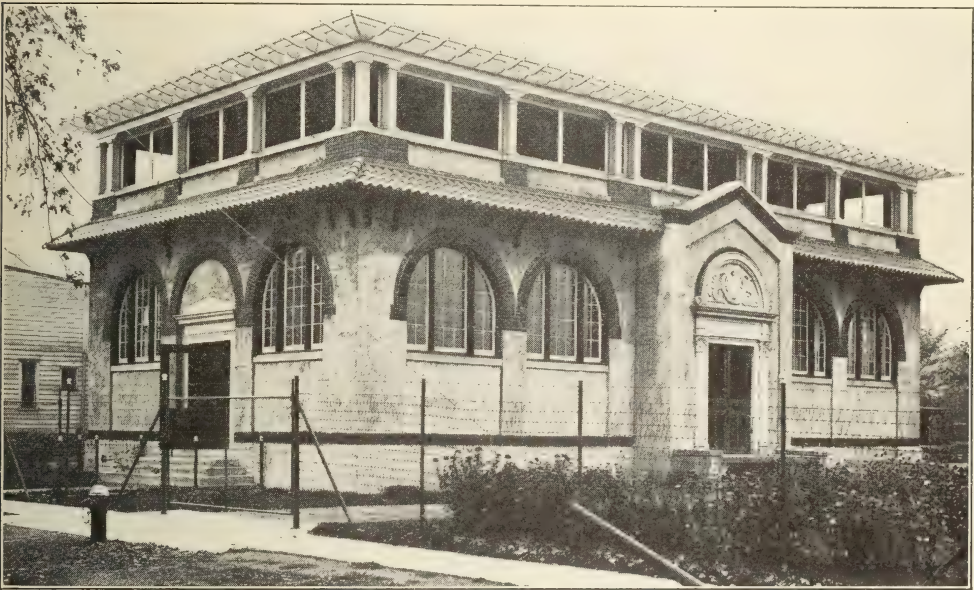
The main pumping units are three large and two small electric-driven centrifugal pumps of the vertical type. The pumps are all of the single-suction, open-impeller, volute type and equipped with iron impellers having large water passages, extra heavy steel shafts, roller thrust bearings, flexible couplings, and handhole openings on both the pump casings and suction elbows. Two of the pumps also have renewable suction discs which can be easily replaced when worn. The prime movers are standard vertical induction motors, the large pumps being driven by motors of the external resistance type, while the small pumps are connected to motors of the squirrel cage type.

The large pumping units consist of two American Type Q Special 15-inch and one Morris Special 12-inch centrifugal pump. The former are rated 3,500 g. p. m. at 450 r. p. m. against a total head of 20 feet,

while the latter is rated 2,800 g. p. m. at 450 r. p. m. against a total head of 23 feet. The small pumping units consist of two American Type Q Special 7-inch centrifugal pumps. These pumps are rated 700 g. p. m. at 600 r. p. m. against a total head of 20 feet. The motors connected to the large pumping units are General Electric Form M motors rated at 35 h. p., while those connected to the small pumping units are General Electric Form K rated at 10 h. p. The large pumps are equipped with 18-inch suction and discharge pipes, while the small

voltage and power consumed. The last panel contains a recording wattmeter for checking maximum demand, the remote control switches for the large pumping units, and a time switch by means of which any one of the large pumping units may be automatically placed in service.

Additional instruments include indicating and recording liquid level gages for determining the level of the sewage in the suction pits and the head on the pumps, and a Type M Venturi register for determining the quantity and rate of sewage pumped.



EXTERIOR OF SCHENECTADY SEWAGE PUMPING STATION, SHOWING ATTRACTIVE APPEARANCE OF BUILDING

pumps have 10-inch suction and discharge pipes. All units operate at constant speed, the large units being manually controlled and the small units arranged for float switch operation.

The power and lighting switchboard consists of seven panels, five of which are for the control of the pumping units. All motor panels have mounted on their face the meters, overload and time limit relays, and the magnetic contactors, while on the back are the compensators and external resistance for starting and pumping units. Each panel is self-contained and arranged for remote control. In addition, there is a panel containing the main power feeder switch, the lighting switches, and electric meters for the determination of the line

The 30-inch sewage meter tube is placed in the force main just outside the building and is enclosed in a concrete vault below the street level. The pressure is transmitted from the tube to the register by means of a system of piping and oil seals filled with kerosene oil.

The air compressor for furnishing air for cleaning purposes consists of a duplex piston type compressor direct-connected to an induction motor. The capacity of the unit is 15 feet of air per minute at a maximum pressure of 90 pounds per square inch, and the motor is rated at 5 h. p. The unit is provided with a control panel which maintains the pressure of the air in the supply tank at any predetermined point.

The sump pump consists of a 1½-inch



Alberger horizontal centrifugal pump direct-connected to a small induction motor. The capacity of the pump is 50 g. p. m. at 1,800 r. p. m. against a total head of 23 feet, and the motor is rated 1 h. p. This unit operates under a high suction lift, being mounted on the motor room floor.

### Operation

The station went into operation in January, 1915, or about the same time that sewage was first diverted to the sewage treatment plant. It has been in continuous operation since that time, with the exception of the periods when changes were being made to improve the operation and efficiency of the pumping units or when the flow could not be treated at the treatment plant.

The changes and improvements to the station proper have not been extensive, consisting mainly of the installation of partitions to separate the motor and screen pit room; the mezzanine floor and stairways for the office and toilet rooms; the hoisting equipment for lifting the motors and transformers, the steam heating system; and the painting of the pumping units and the interior of the motor room.

The additions and improvements to the pumping machinery and appurtenances have been more numerous and cover a longer period of time, being adopted only after experiment had shown them advisable. They include the changing of the shape of the suction pits and the installation of sluice-gates and a by-pass to divert the sewage flow from the station to the river; the installation of a new type of cover and impeller and heavier shaft in four of the centrifugal pumps, thereby improving the operation under the severe service encountered in sewage work; the removal of one 15-inch pump and the installation of the 12-inch pump to handle the night flow, thereby obviating the need for throttling the discharge; and the installation of the air compressor, sump pump, Venturi meter, wattmeter, liquid level gages, and various other electrical and mechanical equipment.

The station has a total pumping capacity of 16 million gallons per day, but the average dry weather flow on a 24-hour basis amounts to  $4\frac{1}{2}$  million gallons, or approximately that estimated at the time plans for the station were prepared. The maximum

dry weather flow sometimes approaches a rate of 7 million gallons per day, and the minimum or night flow very rarely goes below a rate of  $2\frac{1}{2}$  to 3 million gallons per day. During the short periods when the river is at flood stage, the pumps are not operated and the sewage flow is by-passed to the river.

During the first five years of operation, sewage was pumped throughout the twenty-four hours of the day, and during the last three years of this period, no operator was in attendance from midnight to 8 a.m., the 12-inch pump successfully handling the night flow. In case of power failure, the pumping unit in use automatically shut down and the sewage flow was diverted through the by-pass to the river. When power service was resumed, the pumping unit automatically started up again and pumping continued as before. For the past two years, the pumps have been operated from 7 a.m. to midnight, analyses of composite samples of the crude sewage collected during the other seven hours of the day indicating that it compared favorably with the trickling filter effluent at the treatment plant. By following this procedure, not only has the cost of pumping been considerably reduced, but the treatment plant, which has always been overloaded, has been relieved of some of its load.

The station, complete as it stands to-day, represents an investment of about \$60,000. To date, the cost of operation has varied somewhat from year to year, depending on whether or not the pumping units have been operated continuously. On the basis of pumping over a 24-hour period each day, the cost of operation amounts to approximately \$10,000 per year. The major item of such cost is that for power service, which, at the present maximum demand and consumption rates, figures about 2 cents per kilowatt hour. The operation of the station is looked after by two regular operators and an extra man who spends two days per week at the station and the remainder of the week at the treatment plant.

### Overcoming Troubles in Operation

The troubles encountered during eight years of operation have not been serious and have been confined mostly to the suction pits and pumps. The shape of the suction pits was changed to provide hopper-

shaped bottoms and divert the settling solids in the crude sewage flow directly under the inlet to the suction pipes. It was found that the type of pump first installed was not adapted to sewage pumping work under the conditions existing here, and the changes already mentioned were accordingly made. With the installation of impellers having larger water passages, the bar racks with  $\frac{3}{4}$ -inch clear openings, originally placed in parallel with the existing bar racks, were removed. Very little clogging has occurred, and the cost of hauling the screenings has been very materially reduced. At the present time, the racks are raked at 4-hour intervals during the day and once at night. The screenings are placed in metal cans with tight-fitting covers and stored for a period of three to four weeks. With the original arrange-

ment of racks, it was necessary to haul the screenings away each day.

Very little trouble has been experienced with the electrical equipment, although there has been occasional burning out of the coils of the magnetic contacts and compensators. It is believed that this trouble is due to the use of a higher voltage than that for which the equipment was designed.

The credit for the successful operation and pleasing appearance of the station rightly belongs to the operators in charge of the station during the time stated. Fortunately, they have been skilled mechanics and have taken a great deal of interest in their work. Their efforts have not been entirely unrewarded, for the station is looked upon with pride by the citizens of the city.

## The Realtor and the Community

By Henry R. Brigham

Counsellor at Law, Boston, Mass.; Chairman, Housing Committee, National Association of Real Estate Boards

A REALTOR is a real estate broker, operator, or manager who is a member of a real estate board or exchange which is a member of the National Association of Real Estate Boards. The Association was organized to put the real estate business on a high ethical professional basis, and every individual member who wishes to retain his membership must live up to a code of ethics, just as members of bar and medical associations are required to do. It is also constantly investigating and recommending the adoption not only of improved methods of transacting real estate business, but ways and means for protecting and benefiting real estate interests. It acts as a clearing-house for all the progressive real estate boards of the country.

Multiple listing and the licensing of brokers are two of the progressive methods of doing business that are now being advocated and adopted. The Association has committees studying legislation, taxation, city planning, appraisals, subdivision, financing, and "Own Your Own Home" campaigns, and it is now considering the forma-

tion of a Research Bureau to gather the statistics which will be of value to these committees, and to advise the Association and local boards in all matters of public interest affecting real estate.

There is no class of business or professional men to whom the best interests of a community are more at heart and of more vital consequence than to the realtors. A town or city, like an industry, is always either dying or growing, and the realtor's success depends on its growth. Everything he does or does not do that hinders the growth of a city, or of any part of it, hurts his business in the long run. By growth of a town or city is meant not merely growth of population, business, or area, but growth of prosperity, and improved living and working conditions, resulting in better health and greater happiness of its population. A city or town with a growing business and population which does not wisely take care of that growth and therefore finds itself burdened with the problems of bad housing resulting in poverty, vice, and crime, will not have property values or general prosperity equal to those of a city which



has similarly grown but which has had vision and, by proper building and zoning ordinances, and by wise real estate and housing developments, has kept its inhabitants well housed, its jails and poor-houses empty, and its streets and buildings inviting to visitors. Real estate values quickly reflect good and evil influences, and no one in a community is better qualified by experience to judge the value of any proposed community development than the progressive realtor.

Realtors should therefore lead in all matters of community interest which affect real estate, but they often do not do so because their fellow citizens believe that they have only selfish interests. Their National Association is therefore now striving to have them take the part that they are so well qualified to take, and to have them deservedly gain the confidence of their communities, with consequent leadership. The proposed Research Bureau is designed to help in this matter by being able to prove by indisputable facts the actual results of laws, policies, plans, and methods for the benefit of communities considering similar propositions. If realtors can show in dollars and cents as well as in evidences of increased or decreased appearance, health, or happiness of a community the direct results of any reforms, they can help their communities in adopting or avoiding similar reforms and prove their points without question of selfish interests.

#### **Zoning from the Realtor's View-Point**

Progressive communities everywhere are considering zoning and city planning, and in most cases are being advised by experts whose interest in real estate values is more or less a second consideration. Wise zoning or city planning should not only have direct results in the health, comfort, and happiness of a community, but it should as a whole raise property values. If, for instance, an individual owner should object because he is deprived of the possibility of a prospective profit through the erection of an apartment house in a neighborhood where apartment houses are prohibited, the zoning is not wise unless the gain to the neighborhood more than offsets the individual's specific loss or unless the property of the individual is made of more value for the purpose for which it is restricted. In

any large city a real estate board can give expert advice as to zoning plans and can by joint action eliminate any question of individual selfish interests. The National Association of Real Estate Boards is cooperating wherever possible in developing zoning and city planning, and a former president of the Association is one of Secretary Hoover's zoning committee, which has recently published a zoning primer.

The recent high costs of building have resulted in a tendency to break down building restrictions and to weaken building codes. Unwise building restrictions and unreasonable provisions in building codes are too common, and amendments in both should be made in many cases, but shoddy construction and unsanitary or unsightly buildings are evils which realtors know result in lowering real estate values. The National Association has therefore taken an active interest in standardizing building codes in order to get the best results with the least waste and to uphold building ordinances that are wisely designed to protect property values. They suffer the unjust charges of being "profiteers" by fighting against measures which will result in temporary gains to a few tenants at the cost of far greater losses in the end to the community. In the same way they have fought rent legislation which has been designed to give profit to tenants but which hinders natural growth, to the permanent detriment of said tenants as well as of the community as a whole. These are all matters where facts and figures properly compiled by a Research Bureau can be of great value to any civic body interested in community welfare.

Every local real estate board which is a member of the National Association has the backing of that Association, which means that it can call to its aid the expert advice of the Association's leaders and get the full benefit of the experiences of all the other 464 or more boards of the country. Prejudice against "real estate men" still exists, as it does against many other classes of men, and it also is doubtless unhappily justified in some individual instances; but the sooner other civic bodies recognize what *realtors* stand for and give them more of the share in the civic responsibilities which they should bear, the sooner can progress be made in the growth of any community.

# The Scajaquada Creek Drain

Buffalo, N. Y., Is Doing Away with a Public Nuisance Through the Construction of an Underground Drain

By Patrick Kane, Jr.

Buffalo, N. Y.

**T**HREE years ago, at a general election, the people of Buffalo declared the Scajaquada Creek a public nuisance and voted in favor of having a large portion of it—that which flows through the east side residential district—converted into an underground drain. This, in substance, is now being taken care of.

The Scajaquada Creek proper flows through the entire north side of the city.

perts reckoned it a hard job, made difficult through the various obstacles to be overcome. Chief among these were the water and the rock problems. Hard, compact limestone was encountered just below the surface of the creek-bed. The drain itself, or rather that portion of it now under construction, is 6,000 feet long. And the average depth of rock to be excavated is 8 feet.



THE END OF THE FINISHED ARCH OF THE SCAJAQUADA CREEK DRAIN

Estimated approximately, the length is about six miles. The creek pursues a winding, diagonal course from east to northwest, emptying into the Niagara River. It serves as a non-sewerage drain to the adjacent territory, taking care of the outlying east side especially, where, because of land development, modern drainage has not yet been installed.

In accordance with the wishes of the people, action was begun on this underground drain at once. A survey was made, plans were drawn up and bids let, and the work started the following spring. Ex-

The water problem presented was to take care of the normal water flow while construction was going on. For the most part, pumps were used which drained this water into city sewers; for the rest, it was found necessary to cut through the strata of rock in such a way that there would be a continual channel through the broken stone refill. Of course, in wet weather this rock work had to be suspended until the water subsided.

The drainage area of this creek is 22.40 square miles. During the summer months, the volume of water handled is very slight,



but during the wet season the depth increases to as much as 8 feet. Estimating the width of the creek-bed at 45 feet, one appreciates that the volume of water carried by this creek is considerable.

In drawing up the plans for this work, Metcalf & Eddy, consulting engineers, of Boston, Mass., after carefully studying the project, submitted a report on three different types of drains as practicable for a work of this kind. The first type called for a dish-bottomed drain with side-walls, but no roof. This type was not recommended, and the city rejected it, as scum and refuse would collect on the surface of the open water in warm weather; also, the drain would form a breeding ground for mosquitoes. It would also have been necessary to bridge all street crossings for traffic purposes, thus entailing further expense.

The second type considered was a flat-bottomed drain with side-walls and arched roof. The dimensions of this drain were considerably smaller than those of the first type, and it necessitated a detention basin covering, say, 500 acres of land at the upper

end to take care of the abnormal flow of water, which this drain was incapable of handling during the wet season. The expense of buying the land to construct this basin would bring the total cost of this type of drain up to that of the third type. The city therefore rejected the second project as unsuitable.

The third project called for a flat-bottomed drain with side-walls and roof-arch similar to that of the second type, only larger. This type of drain was to be 14 feet high from the floor of the center of the roof-arch. The average width was 28 feet, and in some places it ran as wide as 33 feet. This drain is capable of handling a water flow of 5,600 cubic feet per second past a given point. This capacity was chosen after a careful study of rainfalls and flood flows, with the intention of making it adequate for such a flood as would probably occur about once in 25 years, after the district has reached such a point of development as it may attain in about 25 years. With the development in its present status, the critical flood would probably be met only once in 50 or 100 years. This is the drain selected by the city of Buffalo for Scajaquada Creek.

### Bridges Eliminated

This drain does away with all bridges. In the present section under construction, six bridges have been removed, one of these a splendid, three-arch, massive stone structure which carried Humboldt Parkway. All streets crossing the new drain will be laid down over the arch, which will be constructed to sustain a load of 1,000 pounds per square foot, including its own weight.

The Buffalo dredging Company, contractors, are in charge of the construction of the new drain. They are using the best materials obtainable, every lot or shipment received



BUILDING THE SCAJAQUADA CREEK DRAIN IN FLORIDA STREET, BUFFALO

being thoroughly tested several times before being used. For the concrete work, Pennsylvania portland cement is being used, the testing of which is in charge of the R. W. Hunt Company. All steel used is tested by the Pittsburgh Testing Laboratories.

The side-walls and roof of this drain are of concrete, reinforced with two rows or layers of  $\frac{3}{4}$ -inch bars. These bars run horizontally as well as vertically, and where they cross each other are securely wired together so as to be held in place till the concrete is poured. On the top of the arch, about 9 inches separates the layers of iron reinforcement. In the side-walls, about 14 inches separates the rows of iron work. The arch throughout was designed for unusually heavy loads because of the probability of street crossings in locations which could not be foreseen, and also because of the possibility of the storage of heavy material over the drain in certain localities. The thickness of the concrete in the roof-arch is 12 inches at the center, sloping out to 21 inches near the side-walls. The side walls are 18 inches thick, and are backed up by a solid, natural wall of limestone. The floor is of smoothly finished concrete, laid directly on the rock, the smoothness of the floor facilitating the flow of water by offering no obstacle on which sediment or silt can gather.

To fit the topography, the slope of the lower section of the conduit was made .0017 on tangents, and compensation for curvature amounting to .001 additional was provided on curves. In this section of the conduit, the velocity at times of flood discharge is expected to be about 15 feet per second, and under high velocities the loss of head due to curvature is known to be considerable. The upper section, construction of which has not yet been begun, will be built on a slope of .0008 on tangents and .0011 on curves. In this section, the maximum velocity will not exceed 11 feet per second.



A CONSTRUCTION SCENE IN THE SCAJAQUADA CREEK DRAIN DURING WET WEATHER

The increase in velocity at the change of grade will involve a loss due to the additional velocity head required. This has been provided by a drop in the conduit, to be accomplished in a distance of 50 feet horizontally.

The capacity of the conduit, as designed, varies from 3,130 cubic feet per second at the upper end, to 5,620 cubic feet per second at the lower end, the total length being 15,380 feet. The drainage areas tributary to the creek are 16.15 square miles at the upper end of the conduit, 22.40 at the lower end, and 23.95 at the mouth of the creek.

In the slope or grade given this drain, the amount of rock excavation was kept as low as possible; at the same time, sufficient cover was provided so that the arch might be protected and the small water pipes and drains could be laid below the surface. All large water-mains and sewers that cross this drain will be raised and laid on the top of the arch, and will then function by the siphon method.

Manholes are provided at street crossings, giving access to either end for entrance. Weepers of 5-inch vitrified pipe are provided every 50 feet at the level of



the bottom of the side-walls, to take care of water seepage through walls.

The forms used in the construction of the concrete arch are of the movable type—on wheels and tracks. They are of steel and can be moved as the work progresses. In constructing the side-walls, steel forms were used, while for the overhead arch work the top surface of the forms was of wood. The wooden forms are well oiled, and the seams where the sections of the forms join together are covered with strips of thin sheet-iron to prevent the fresh concrete from leaking through. Once the concrete is set, these forms can be loosened, dropped down and run out from under the arch.

Considerable curvature necessarily enters into the location of this drain. With but six exceptions, the deflections have been made with curves of 210 feet radius; and most of them represent changes in direction considerably less than 90 per cent. The six exceptions are: 95 feet radius, 110 feet, 146 feet, 154 feet, 260 feet, and 260 feet.

One portion of the old creek, approximating 1,200 yards, formerly ran a crooked course parallel to Florida Street. At one

end, this creek ran directly alongside the street, and at another point it was over 100 feet from the street. The engineers, in laying out the course of the new drain, saw here a chance for improving the new course over the old one; so instead of following the course of the old creek-bed, they made a new course directly through Florida Street. The street was dug out and the new arch-drain built within it. The old water-course was then filled in, thus making additional land available for the use of the abutting property owners, should the city so authorize.

The cost of this drainage work is rather high on account of the existing market prices of materials and labor. In view of this, the city decided to divide the Scajaquada Creek job into three—possibly four—sections, and to proceed with the construction of each section as the financial condition of the city allows. The money to defray the expense of this improvement is to be raised by taxation, general or local, to be decided by the city authorities at a later date. In the meantime, the work on the first section is nearing completion—6,000 feet of underground drain, built at a cost of \$1,449,000.

## Rubber Roads Invented in England

Special Type of Rubber Block Pavements Developed for Traffic  
Running on Rubber Tires

A NEW type of rubber composition paving block has been developed in England which it is claimed can be placed on the market at a price to compete with the ordinary creosoted wood block, when it is taken into consideration that the composition blocks are noiseless and have an estimated life of 15 years. Two types of blocks have been produced, one made with a core, surfaced with a ½-inch hard vulcanized rubber, and a second consisting of the core only. The principal ingredients of the core, which have been patented, are rubber, jute, and china clay. These ingredients enable the whole block to be vulcanized in one piece, as it has been found by experiment that the block should be a solid mass and not made up of separate superimposed portions. When the block has been hollowed out and filled with concrete or wood to reduce cost, it has been found that the rubber surface creeps and shows wear on the underside at the place of contact and not on the surface.

In an experiment with a wooden block upon which a steel plate was placed as a seat for a rubber surface, it was found that the heavy traffic turned up the steel plate at the edges. At St. Pancras railway station, London, the covered way under the hotel is surfaced with a sheet of rubber of about ½-inch thickness. It is claimed that there is a tendency for the rubber sheet to "lick up," so that it must be pegged down from time to time. As a result of their experiments, manufacturers have decided that the separate solid blocks give the best results. The block proposed is similar to the wooden block used ordinarily for street paving, and measures 9 x 4½ x 3 inches.

Up to the present time it has not been possible to manufacture rubber blocks at less than three times the cost of wood paving, which is about \$5.40 per square yard. The Gould block core is claimed to be made at 4 cents per pound, and it is expected that the price of paving will not be more than \$13.34 per square yard.

# Combustion of Coal in Boiler Furnaces

A Practical Talk for the Power-Plant Superintendent

By M'Kean Maffitt

Superintendent, Water and Sewers, Wilmington, N. C.

**I**N the average boiler plant too little thought is given to obtainable efficiencies and necessary economies. No matter how small a plant may be, fuel economies are well worth striving for, not only from a dollars and cents point of view, but also for the sake of national conservancy. A dollar spent for apparatus or labor that will save a dollar's worth of coal, is a dollar well spent, because after it is spent we still have the coal, and if it is spent for apparatus, we have the apparatus too.

Let us take a shovelful of coal, say 20 pounds, and see what we should get, and what we do get, out of it.

Twenty pounds of good Pocahontas coal equals 270,000 heat units. One heat unit equals 778 foot-pounds of energy. Therefore one shovelful of coal equals 210,060,000 foot-pounds of energy, or 100,000 gallons of water pumped against a head of 250 feet. That is

absolute perfection. But as we cannot even approximate perfection, we lose in efficiency at every step. We lose when we burn the coal under the boiler, when the heat is absorbed into the boiler, when the steam passes to the steam end of the pump, when the steam end of the pump runs the water end of the pump, and when the water end of the pump pumps the water. In fact, we

lose everywhere, until, at Wilmington, we get for that 20 pounds of coal not 100,000 gallons of water but merely 4,000 gallons—merely 4 per cent of the power that was originally in that coal.

Not all these losses are in the furnace. We will treat only those that are in the furnace and that are preventable.

## Mix Common Sense with Your Coal

If your town is 100 per cent metered, you have paid \$15 or more on each service so that you might have a meter there to see how much water that particular consumer gets. You pay an auditor to check up the cashier to see that he accounts for every cent that he receives and that he collects all that he should collect. Yet you pay a husky laborer to take a scoop—the bigger the better—and throw gold dollars, in the shape of coal, into the fire and burn them up, and never a check is there made to see whether he burns them correctly or incorrectly. Just so he keeps steam on the boilers so that the pumps will not stop is about all that you expect of him. No matter how he does it, steam must be kept up, and nothing much is said about it. If the steam goes down, then you go to the boiler room and bawl out the fireman and order him to throw more coal to the boilers. If you would get down to brass tacks and study your boiler room and your boiler furnaces and mix a little common sense with the coal, your steam pressure would go up and your coal bills would come down.

## Air—How Much, When and Where?

Consider that one shovelful of coal as being pure carbon, and it will require 11.5 pounds of air per pound of carbon for perfect combustion into carbon dioxide. Thus, we have a call for 230 pounds, or 3,066 cubic feet, of air at atmospheric pressure and 70 degrees temperature. This amount of air must be equally and uniformly distributed over and through that coal when it is burning. If it were all applied at once, and could instantaneously unite with that coal, we should

have an explosion that would wreck the plant. It must be applied at the proper time, rate and place, or we shall get poor results. Most, if not all, should go through the fuel-bed. This depends on the thickness of fuel on the grates. If the fuel is too thin, it should all go through the bed. If the fuel is too thick, some of it should go in over the fuel-bed. But as this is



rather a ticklish proposition, it is better by far to have the fuel-bed the proper thickness so that all of it can go through the bed and do its proper work. However, if the fuel-bed is a little too thick, some of the air should be let in over the fire, but just enough to burn those gases that are distilled immediately after green coal is thrown onto the fire. As this is a very delicate adjustment, you should be very careful of it and have the best known methods of admitting this air over the fire, so that as soon as the excess gases are consumed, this over-fire air can be shut off and all the air passed through the fuel-bed.

The air that goes through the fuel-bed should be equally and evenly distributed throughout the whole mass of fuel. There should be no very bright places (blow-holes) nor any very dull spots (thick places). Where there are bright places, the fuel is too thin and too much air is getting in. This air simply tends to cool the fire. Where there are black or dark spots, not enough air is getting in and you are making carbon monoxide. When your fire is too thick, you make, and then throw away, the same kind of gas that your wife uses to cook with.

Your fireman knows that if he leaves the fire-doors open he will not get any steam, because his fire will be cooled down so fast that it will not be hot enough. But does he stop to think that several little bright spots may let in enough air to equal the amount let in through one fire-door? In either case he gets too much air and at the wrong place, and the coal pile suffers. He has to burn more coal to get the same amount of heat to the boiler. He also knows that if he shuts off the draft he cannot keep up the steam pressure, because his fire will not burn fast enough. If he has several dark spots in his furnace they may be shutting off as much draft as one fire-door will shut off. In either case the coal pile suffers, because then he is making carbon monoxide and not carbon dioxide.

Take each pound of that shovelful and burn it with the proper amount of air at the right time and place, and you get carbon dioxide as a result and 14,544 heat units that are ready and willing to go into the water that is in the boiler. Take the same pounds of coal and burn them with the doors shut tight, or with the fire choked down with too much coal, and out of each pound

of carbon you will get carbon monoxide and only 4,351 heat units—a loss of 10,193 heat units, or 70 per cent.

We cannot get perfection in our work, nor do we need to take the very least work offered, but there is a happy medium somewhere that all of us can reach, and all of us who go above that happy medium are working towards greater efficiency. This happy medium will approximate the combustion of carbon into carbon dioxide and will give us such results that we shall be greatly surprised.

The best obtainable results will be with a little too much air rather than with a little less than necessary. Just about 40 or 50 per cent too much air will give the best results obtainable in very good practise.

I can take the average boiler plant and let the regular fireman fire the boilers, take a little waste, putty and cement, a candle and then some good boiler wall covering, and in less than two hours I can have that boiler popping off so much that the fireman will think that his steam gage or pop-valve is out of order. Hold the candle flame near the walls and watch the draft draw it into the cracks. Ram the waste and putty or cement in the crack. Go over every square inch of the setting like that, and then plaster the whole thing over with a good boiler wall covering, and I venture to say that at the very least you will save 5 per cent of your fuel.

### A Fuel-Bed of the Right Thickness

Suppose that your boiler walls are tight and you are still getting a low percentage of carbon dioxide. The chances are that your fire is so thin or irregular that about 200 per cent excess air is getting in through the fire-bed. Fill up those holes or bright spots and level the bed down until it is about 4 inches thick, not including ashes and clinkers. Four inches of fuel, not over 5 at the most, is the proper thickness of fuel-bed. When you get the fire to this thickness, take another carbon dioxide sample and it will have gone to 10 per cent or over. Now you are getting somewhere. Your preventable fuel losses will be only about 6 or 8 per cent.

The best thickness of fuel-bed that I have ever found is between 4 and 5 inches, perfectly smooth and free from either bright or dark spots. With this thickness of fuel-bed, you should fire light and fire often. Scatter the coal well over the whole fuel-

bed, unless there be bright spots developing; these must be filled, and you will have a fire that cannot be beat.

If you will always get the same grade of fuel, determine the proper thickness of fuel-bed for that grade, keep the fuel-bed free of holes or thick places, keep the furnace walls tight, let in the air above the fire for only just a little time after firing, fire evenly and fire often, you can keep your carbon dioxide readings around 10 or 11 per cent, reduce your excess air to less than 100 per cent, and your preventable fuel losses to less than 8 per cent, and all the necessary equipment is an Orsat flue gas analyser at about \$40. If you will add to the Orsat a few draft gages, automatic draft and feed-water regulators, and a couple of good thermometers, you can still further reduce your losses and save coal.

Take the Orsat and get a few flue gas analyses. Take a sample and then look at the fire. Try another one and observe the difference in the fire and in the sample. If your percentage of carbon dioxide is low, see if the fire is not too thin or if it has any bright spots in it. Build up the fire a very little and fill up the holes with live coals or with fresh fuel and then take another sample of gas. Observe the difference. The fire will be brighter all over, and the percentage of carbon dioxide will immediately show an increase and the preventable fuel loss will show a decrease. Keep trying this arrangement until you get the right method when governed by the carbon dioxide readings. Do not make the readings for just one day and then sit down and wait results, but make them every day. Take the fireman with you. Show him what it means to the coal pile to have the fire just right. Let him see that you have a check on him and can tell just how he is taking care of his fire. In about three months the coal dealer will call up to ask when you put on central station power. He will think that you have stopped the use of coal, your fuel bills will be so little.

### **Raking and Shaking**

Another bad leak of fuel is in the cleaning and raking of the fires; also in the shaking of the grates in the type of grate built for that purpose. About 4 per cent of the carbon of coal is wasted in the ash when cleaning fires. Take that shovelful of coal, 20 pounds, and throw 4 per cent, or about one

pound, of it in the ash pile. That is what you are doing every day in the average boiler plant. If your grate openings are too large, if your fireman too freely rakes the fire, if he overloads the fire-bed on shaking grates and then runs the fire down through the grates, if he takes a slash-bar and turns the ash up on top of the fuel-bed, he is wasting coal, both in the ash and in the way that he burns what is left in the furnace. Go home to your ash pile and take a few shovelfuls of ashes and clinkers and wash them down with water. Take each lump left and examine it closely. Put each clinker to one side and each piece of coke to the other side. Then sit there and look at what is being thrown away every time your fires are cleaned.

I know that it is some job to stand in front of a boiler and clean out the fire, because I have done it. Hang a couple of hooks in front of your boiler. Hang a piece of pipe, with a trace chain curtain on it, on these hooks in front of the furnace door. Insert the fire-cleaning tools through this chain curtain, and you can stand there and clean the fire better than you could otherwise and not get half of the heat in your face. The chain curtain holds the heat in the furnace, yet it allows sufficient visibility and freedom for the fireman to properly clean his fires.

Maybe you think that if your boiler-shell is right down in the fire you are getting good results. You are not. That boiler-shell acts like a dash of cold water on the fire. It cools the gases so quickly that they cannot burn.

If your steam pressure is 100 pounds gage, your temperature in the boiler is about 338 degrees. If you have done all the things that I have suggested, your furnace temperature is about 2,200 degrees. That boiler-shell is colder to that fire than the North Pole is to the Equator. The difference of 1,862 degrees, or 600 per cent, makes such a reduction in the flue gas temperature that it is simply impossible to burn the gas satisfactorily.

The ignition temperature of carbon is 766 degrees; carbon monoxide, 1,210 degrees; hydrogen, 1,130 degrees; hydrocarbons, 900 to 1,200 degrees; all are above the temperature of the boiler-shell. Now suppose that there is 25 per cent volatile matter, or gas, in your coal. This volatile matter is distilled off as soon as the coal is fired, and



you must have a furnace temperature sufficient to ignite it, and space enough in which to burn it; otherwise you lose it up the stack. If this volatile matter is hydrogen, or hydrocarbons, it has a very heavy heat value, especially the hydrogen (50,000 to 60,000 heat units per pound), and it must be burned above the fuel-bed. How can you retain it at a temperature of from 900 to 1,200 degrees when it is in contact with a boiler-shell that is only 338 degrees? It simply is not burned; it passes up the stack as smoke.

Did you ever notice a lump of coal spit

a stream of smoke until a flame was put near it, when it immediately ignited and then burned just like a regular gas jet? That is what it was, a gas jet. That same little stream of smoke, or gas, multiplied a million times, is that stream of smoke you see coming from so many stacks. If all the air leaks are stopped, the boiler-shell raised high enough above the fire, the fire carried at the right thickness and not fired too heavy, that smoke will stop and all that heat value will be added to the bank account.

ACKNOWLEDGMENT.—From a paper presented at the annual meeting of the North Carolina Section, American Water Works Association, November, 1922.

## Operating Costs of City Departments

**A** REPORT of Financial Statistics of Cities for the year 1921 was issued by the Federal Bureau of the Census in December, 1922. Detailed data are given for 183 of the 253 places having a population of over 30,000. It is explained that omission of the financial statistics of 70 cities is due to the failure of the officials of those cities to cooperate with the Bureau of the Census by preparing the census schedules. The scope of the report is indicated by the following paragraphs:

The purpose of the Bureau in compiling this report is to provide information in regard to the financial administration of the cities, in such form as to be comparable, with the hope that it may be of assistance to the officials who are charged with responsibilities incident to the administration of local government and the betterment of the local communities; directly, through personal study of the reports, and indirectly, through the interpretations and recommendations of practical students of civic affairs and of local civic bodies.

The cities of this class are responsible for the protection of the lives, property, and health of their own inhabitants, constituting over one-third of the population of the Nation, and of many millions of persons who visit them, as well as for providing educational and recreational services, caring for the indigent, defective, and delinquent classes, and arranging for a constantly growing number of conveniences and

services which are demanded by associations interested in the betterment of the several urban communities.

The statistics of the 183 incorporated places represented in this report are presented in 16 general tables. Table 1 gives certain statistics relating to population and area; Table 2 gives the date of the close of the fiscal year of the divisions and funds of the governments of the municipalities, and the totals of their revenue and non-revenue receipts and governmental-cost and non-governmental-cost payments, together with their cash balances at the beginning and close of the year; Table 3 summarizes the revenue receipts and governmental-cost payments by divisions of the city government, and makes certain comparisons between those receipts and payments; Table 4 presents per capita averages, and Table 5 the per cent distribution of the receipts and payments shown in Table 3; Tables 6, 7 and 8 present detailed statistics relating to revenue receipts; Tables 9 to 12, inclusive, present detailed statistics of payments for governmental costs, together with certain per capita averages and data on per cent distribution of payments for expenses; Table 13 shows the non-revenue receipts and non-governmental-cost payments; Table 14 sets forth the value of certain assets; Table 15 relates to municipal indebtedness; and Table 16 presents statistics of the assessed valuation of property subject to taxation and the amounts and rates of tax levies.

From the information given in tables 9 and 10, THE AMERICAN CITY has compiled

### ASSESSED VALUATIONS, PER CAPITA LEVIES, AND NET DEBTS

(186 cities are represented, 3 more than in the table on the next page)

	Group I	Group II	Group III	Group IV	Group V
Assessed valuation per capita subject to general property tax for government of city.....	\$1,331.28	\$1,430.54	\$1,181.29	\$1,053.73	\$1,078.97
Per capita levy of general property tax for all purposes .....	37.85	39.54	36.28	32.95	32.59
Per capita levy of general property tax for government of city.....	36.20	34.33	27.14	24.81	24.62
Net debt at close of year.....	1,564,287,906	221,298,634	352,989,426	189,598,273	136,106,806
Net debt per capita.....	111.87	97.83	59.86	52.44	46.46

the following tabulation of the expenses of the general departments (other than for public service enterprises) of the 183 cities, total and per capita; also the per cent distribution of these expenses, showing the relative importance of the principal classes of expenses in five groups of cities:

Group I—9 cities having a population of over 500,000

Group II—6 cities having a population of 300,000 to 500,000

Group III—36 cities having a population of 100,000 to 300,000

Group IV—56 cities having a population of 50,000 to 100,000

Group V—76 cities having a population of 30,000 to 50,000

In the tabulation at the bottom of page 156 there are given certain figures from Table 15 of the Census Report on municipal debts and from Table 16 on assessed valuation and per capita levies.

GOVERNMENTAL-COST PAYMENTS FOR EXPENSES OF GENERAL DEPARTMENTS (OTHER THAN FOR PUBLIC SERVICE ENTERPRISES)

	Group I	Group II	Group III	Group IV	Group V
<i>Total for all general departments...</i>	\$501,705,756	\$69,269,299	\$149,690,374	\$84,678,584	\$68,041,068
Per capita .....	35.88	30.62	25.38	22.25	23.23
<i>General Government .....</i>	56,959,304	7,006,154	9,661,693	5,533,321	4,763,686
Per capita .....	4.07	3.10	1.64	1.45	1.63
Per cent of total .....	11.4	10.1	6.5	6.5	7.0
<i>Police Department .....</i>	55,764,964	6,002,849	15,829,936	7,587,552	5,598,996
Per capita .....	3.99	2.69	2.68	1.99	1.91
Per cent of total .....	11.1	8.8	10.6	9.0	8.2
<i>Fire Department .....</i>	34,922,125	6,329,351	16,716,311	9,435,156	6,785,992
Per capita .....	2.50	2.80	2.83	2.48	2.32
Per cent of total .....	7.0	9.1	11.2	11.2	10.0
<i>All other protection to persons and property .....</i>	9,945,174	1,321,487	2,037,235	916,364	642,183
Per capita .....	0.71	0.58	0.35	0.24	0.22
Per cent of total .....	2.0	1.9	1.4	1.1	0.9
<i>Conservation of Health .....</i>	1,106,164	1,826,158	3,986,454	1,994,515	1,562,335
Per capita .....	0.79	0.81	0.68	0.52	0.53
Per cent of total .....	2.2	2.6	2.7	2.4	2.3
<i>Sanitation, or Promotion of Cleanliness .....</i>	43,246,606	5,672,415	12,019,500	6,350,960	4,781,195
Per capita .....	3.09	2.51	2.04	1.67	1.63
Per cent of total .....	8.6	8.2	8.0	7.5	7.0
<i>Highways—General Expenses .....</i>	45,594,795	7,149,182	15,011,555	7,897,759	7,869,825
Per capita .....	3.26	3.16	2.55	2.08	2.69
Per cent of total .....	9.1	10.3	10.0	9.3	11.6
<i>Highways—Repair and Construction for compensation .....</i>	821,142	390,802	1,088,197	475,902	285,734
Per capita .....	0.06	0.17	0.18	0.13	0.10
Per cent of total .....	0.2	0.6	0.7	0.6	0.4
<i>Charities, Hospitals and Corrections .....</i>	43,076,002	5,437,574	6,369,011	3,012,359	2,153,032
Per capita .....	3.08	2.40	1.08	0.79	0.73
Per cent of total .....	8.6	7.8	4.3	3.6	3.2
<i>Schools .....</i>	152,182,576	22,677,900	55,991,681	36,163,638	28,913,294
Per capita .....	10.88	10.03	9.50	9.50	9.87
Per cent of total .....	30.3	32.7	37.4	42.7	42.5
<i>Libraries .....</i>	5,375,393	994,054	2,076,708	1,121,277	973,924
Per capita .....	0.38	0.44	0.35	0.29	0.33
Per cent of total .....	1.1	1.4	1.4	1.3	1.4
<i>Recreation .....</i>	16,946,174	2,268,946	5,108,923	2,442,211	1,901,274
Per capita .....	1.21	1.00	0.87	0.64	0.65
Per cent of total .....	3.4	3.3	3.4	2.9	2.8
<i>Miscellaneous .....</i>	25,765,337	2,102,427	3,793,170	1,747,570	1,809,508
Per capita .....	1.84	0.93	0.64	0.46	0.62
Per cent of total .....	5.1	3.0	2.5	2.1	2.7

## Municipal Employee Problems to Be Studied

TO study and formulate the best methods of selection, transfer and promotion of public service employees is the primary function of the newly organized Bureau of Personnel Administration at Washington, D. C. Professor L. L. Thurstone, Head of the Department of Education and Psychology at Carnegie Institute of Technology, Pittsburgh, is Director of Research in charge of the Bureau. The

Bureau is to be affiliated with the Institute of Government Research and has been privately endowed subsequent to appeals for its establishment from the United States Civil Service Commission. An advisory board of five members of the national civil service commissions will supervise its operation. Its field of work covers investigations of state and municipal employee problems in addition to those of the federal service.



# Resurfacing Methods in American Cities

## Ways of Extending the Life of Stone, Brick, Asphalt and Concrete Roads

**I**N his annual address, Hon. Robert McNutt, Mayor of Muscatine, Iowa, and President of the League of Iowa Municipalities, summarizes in an interesting manner the methods used in resurfacing old paving in a number of American cities.

Lakewood, Ohio, levels off the old base with a binder course and surfaces with sheet asphalt or asphaltic concrete.

In Middletown, Ohio, the old brick is first cleaned and then covered with a 1½-inch layer of crushed stone, 1½-inch size. Tarvia X is then applied, about one gallon per square yard, followed by stone chips about ¾-inch deep. The pavement is then rolled with a steam roller. The binder is then applied at the rate of about ½-gallon per square yard and covered with about ¼-inch of torpedo sand. There is another application of ½-gallon per square yard of the binder and the pavement is rolled. After the street has been subjected to travel for three or four months, the surface is cleaned and ½-gallon per square yard of Tarvia B is applied, and the surface covered with torpedo sand and rolled.

Sandusky, Ohio, covers old brick pavement with 1¾ inches of sheet asphalt on a 1-inch binder after filling depressions in the old brick pavement with additional binder, and tamping it.

South Point, Ohio, either turns over the brick or covers the pavement with sheet asphalt.

Toledo, Ohio, does not believe in resurfacing over old brick pavements where the

brick were not laid on a concrete base.

Wellington, Ohio, covers the pavement with sheet asphalt.

In Beaver Falls, Pa., old brick pavements are thoroughly cleaned and enough binder applied to restore the crown; then they are covered with 2 inches of asphaltic concrete.

In Du Bois, Pa., in 1909, 17,000 yards of brick were resurfaced with 2½ inches of asphaltic concrete.

In Franklin, Pa., sheet asphalt with a binder course was used on old brick pavement.

Greenville, Pa., contemplated resurfacing 25,000 square yards with sheet asphalt or Warrenite.

Oil City, Pa., cleans the pavement and fills depressions more than 1 inch deep with binder and then lays binder with 1-inch minimum depth and a 1½-inch top of standard sheet asphalt.

Sewickley, Pa., uses a 2-inch thickness of bituminous concrete.

In Oshkosh, Wis., brick pavement is generally resurfaced by turning the brick, replacing broken bricks with whole ones. About 6,000 square yards were covered last year with a mat of tar, roofing gravel and sand ½-inch thick.

In Milwaukee, Wis., old brick pavements are resurfaced by removing the brick and substituting a 3-inch asphalt pavement. In a very few cases, the bricks have been turned, but this has not proved very satisfactory.

## New Method of Paving Bridge Floors

**I**N order that the probability of fire on the Victoria Bridge, Montreal, Quebec, might be reduced to a minimum, it was decided in reconstructing the floor to surface it with two inches of sheet asphalt. In addition to the reduction of fire hazard, there has been a reduction of maintenance cost as compared with that of the old wooden floor. This novel method of treating a bridge floor is proving quite popular in Canada.

To provide for the effect of vibration of the bridge and also for the effect of heavy traffic

and weather, an unusually dense mixture of asphalt was adopted, care being taken to lay it with sufficient resiliency to meet the traffic conditions. Consequently a high percentage of bitumen for plasticity and a maximum amount of filler for stability were specified. After a good deal of experiment, it was found that 13 per cent of asphaltic cement was excessive, and finally 11.6 per cent was adopted. The new bridge floor has now been giving excellent service for two years without additional cost for maintenance.

# Jumping Jack--the Fire Prevention Clown

How Kansas Cities Are Decreasing Fire Alarms from 15 to 35 Per Cent

THE educational antics of Chow-Chow and Chew-Chew, the health clowns, are well known from coast to coast. They have visited hundreds of schools, expositions and county fairs and have spread the doctrine of clean teeth, proper food and plenty of sleep for children. It has remained for Harry K. Rogers, Assistant Fire Chief, Wichita, Kan., to carry this novel idea into the fire prevention and safety-first field. Under the name of "Jumping Jack, the Fire Prevention Clown," Mr. Rogers appears on the school platform or at a county fair in his striking suit of red and yellow and wearing a fireman's red helmet. He talks to the children in a simple and effective manner about fire dangers and fire protection. The children are startled to hear that a fire occurs every minute of the day in the United States. The frequency of the fires is demonstrated by a fire gong that rings each time the big clock, the special property of the clown, ticks off a minute. Greater is their astonishment when they learn that seven out of ten fires are caused by the carelessness of some one in the home or place of business.

Jumping Jack also instructs the children how to turn in a fire alarm correctly, and the dangers of spontaneous combustion from floor mops, oily rags and old clothes if kept in the house in a closet, are explained in simple language.

The following paragraphs are abstracted from a recent talk which Jumping Jack gave before the school children in Salina, Kan. He made his appearance in clown attire, hopping before the children on a pogo stick and waving his hand vigorously:

"Listen to me, I am going to tell you something. The first thing I want to tell you is how many fires we have. Did you know that there is a fire every minute in the United States? Watch this big fire clock over here. [Walks over to large wooden fire clock, so constructed that the fire bell rings every time the big hands pass the minute mark.] Every time this clock rings, or every time this hand moves one space I want you to count. You can all tell time, can't you? All right. Now the first time I want you to say 'One,' the next

time 'One-two,' and the next time 'One-two-three,' and so on, like that. [Jumping Jack starts the clock hands, and the children count.] Oh, you are not doing it as I told you to. I want you to say 'One' the first time it rings, and the next time 'One-two.' Now let's practise it together, and be sure to listen for the fire bell. [Children start counting.] Oh, louder! Oh, louder than that! [Children scream out the numbers.] Fine! I heard you that time. All right. Now let's try it again. [Children count five.] Say, I think some boy down there had better study his arithmetic. [Boy counted six instead of five for the five minutes on the fire clock.] All right. There are five fires in five minutes. Now, how many did I say? Five fires in five minutes. [Children answer.] Now tell me how many fires there are in ten minutes. [Children answer.] Fine! Ten fires in ten minutes. Listen. Do you know that seven out of every ten fires are caused by somebody's carelessness? Just think of it, seven out of ten fires are caused by carelessness. Now, how



HARRY K. ROGERS—JUMPING JACK, THE FIRE PREVENTION CLOWN



many did I say? [Children answer.] Fine! Seven out of ten fires caused by carelessness. Now don't forget that. Listen, you girls. How many fires out of ten are caused by carelessness? [Girls answer.] All right. Now let's count that. [Girls count.] Now you boys. How many fires out of ten are caused by carelessness? [Boys answer.] Come on, boys, let's count that again and drown out the girls. [Boys count.] Now, don't you children forget that, because I am going to ask you again in a few minutes. I am going to ask—[Climbs on ladder, tries to find steps with his foot and misses; tries again and again. Children scream with laughter. Gets foot twisted between rounds on ladder before finally getting it on the step. Children laugh again.]

"There is something else that I want to tell you. If any of you should ever get on fire, I want to tell you what to do. The first thing—don't ever, ever run, because if you run you may burn to death. If you are in the house, just lie down on the floor and roll up in a rug, and it will smother the fire. And if you should happen to be outdoors, just lie down on the ground and roll over and over, but don't run, and the whole time you are doing this, I want you to yell bloody murder. Will you do that? [Children answer.] Maybe you have a little brother or sister at home that might catch on fire, and they are not old enough to know what to do. Let me tell you something. If you are there, you just run to the flour bin. You all have a flour bin at home, haven't you? [Children answer.] Well, you just run to the flour bin and get a pan full of flour and throw it on the fire and it will put it out lots quicker than water. Don't ever use water. Now remember that.

"How many of you have a mop like this at home? [Holds up oily mop. Children raise hands.] Well, when Mother gets the dishes washed and the floors swept, she always takes the mop and goes like this, doesn't she? [Gets mop stick caught between feet and pretends to be unable to get it straightened out; falls on floor. Children laugh.] And she mops all around and when she gets through mopping she takes it in the parlor and stands it against the piano because that is where she keeps the mop. [Children all say "No."] Oh, of course not. Mother doesn't keep the mop in the parlor, because you might have company and she would not want an old oily mop in the parlor. I know what she does with it. She puts it in the kitchen behind the door, or in the pantry or under the stairway in the closet. Maybe in this same closet on the shelf there are some nice soft cloths that she uses to wipe the furniture with. You know those rags that Mother keeps. They are hard to get and she doesn't want to throw them away, so she puts them on the shelf and maybe these rags and this oily mop cause a fire. This kind of fire is called a spontaneous combustion. Now all of you don't know what kind of a fire that is. It is a fire that starts all by itself without anyone to light a match to start it. Will you remember

that and when you go home—[Causes explosion under toy stairway on which he is sitting, runs over to toy phone and calls fire department, jumping up and down excitedly, and does not give them street address of fire. Children laugh and scream.] Listen, children. Now what did I do that was wrong? In the first place, I put the mop under the stairs in the closet. Now when you go home I want you all to look around the house and find out where Mother keeps the mop, and you tell Mother to put it in a tin bucket on the back porch, and if she doesn't, you arrest her. Will you? [Children answer.] But you tell her to never, never keep it in the house. Now I did something else that was wrong. I ran over to the phone and called Central and said 'Hurry up, quick. My house is on fire and I live across the street from the church,' and when Chief Wolbert got the report he thought I lived across the street from this other church up here and when he went up there it wasn't where I lived at all, and by the time he got to my house it was burned down. Now you all know how to use the telephone, don't you? [Children answer.] Now when you go to the phone you tell Central that you want 3X, because that is the number here in Salina, and there is always a man at the Fire Department to answer the phone, night and day. Now will you remember that? Don't forget."

The comments of various fire department officials who have heard and witnessed Jumping Jack's talk and antics are most favorable. Chief Joseph Hanlon of the Topeka Department remarked, "It is seldom a speaker can hold the attention of young children, especially on a fire prevention topic, but this was something out of the ordinary, and I honestly believe that it will accomplish more along the lines of fire prevention than all fire prevention speakers."

The fire prevention program is sponsored by the Kansas State Firemen's Association and the Kansas State Fire Chiefs' Association. The program is essentially for children from the first to the sixth grades, inclusive, and to get the best results, it is necessary to have them brought by their teachers to some centrally located theater or school auditorium. While a stage is not essential, it is better to have one, as several large crates of property are carried by the clown. From a conservation and prevention standpoint there is little doubt that one of these talks is an excellent investment for any city and that it will save a community many dollars, to say nothing of the possibility of saving the lives of some children.

# Dangers to the Sanitary Quality of Public Water-Supplies

By E. Sherman Chase

Sanitary Engineer, Metcalf & Eddy, Boston, Mass.

THE major dangers to the sanitary quality of public water-supplies are, in general, well known to engineers, sanitarians and water-works officials and the necessity for adequate protection against such dangers is thoroughly appreciated. On the other hand, many of the minor dangers are less well recognized, and the extent to which precautionary measures should be taken to guard against some of these is still a matter regarding which opinion is not unanimous. The following discussion has been prepared with a view

to stressing the lesser sanitary hazards, illustrating these hazards in most cases with accounts of outbreaks of water-borne disease for which they have been responsible.

For convenience and clearness, the hazards will be discussed under three classes, namely, hazards to surface supplies, to ground water-supplies, and to supplies in distribution systems.

The direct discharge of sewage into bodies of water from which public water-supplies are taken is, of course, the best-recognized danger. Of late years, the almost universal adoption of purification of supplies taken from sources receiving direct and continuous sewage pollution has resulted in a marked reduction in the typhoid fever death rate in those municipalities having such supplies. The effect of the purification of badly polluted supplies at Lawrence, Cincinnati, Philadelphia, Pittsburgh and many other cities is well known. This direct discharge of sewage into sources of water-supply constitutes the greatest danger to public water-supplies, but this fact is so



A FARM DRAINING TO A WATER-SUPPLY STREAM IN NEW YORK STATE

A case of typhoid had occurred in this farmhouse

well known that there is no need of dwelling upon it at greater length.

*Indirect Pollution.*—The danger from the indirect and less obvious sources of pollution, although relatively less serious than from direct contamination, is nevertheless very real, and examples of outbreaks of typhoid and other intestinal disorders due to indirect pollution are not lacking.

Very few watersheds are entirely free from human habitations. Wherever there are habitations there is also the possibility of typhoid or dysentery and the accompanying danger that the germs of these diseases may reach the watercourses draining the areas upon which the habitations are located. The disastrous epidemic at Plymouth, Pa., is well known.

*Manured Fields.*—A rather startling demonstration of pollution by drainage from manured fields occurred in the village of Cazenovia, N. Y., in the early part of 1918. The water-supply of this village was at that time derived from a small upland reservoir, springs, wells, and at times from Cazenovia



Lake. None of the various sources could be considered above suspicion. During the winter of 1917-1918 the field adjacent to the reservoir was heavily fertilized with barnyard manure. Shortly afterwards there occurred a very sudden and heavy thaw which carried such quantities of manure and seepage from the manure into the reservoir that water in the village was dark mahogany in color and actually frothed when drawn from faucets in the houses. Fortunately, no known ill effects followed this occurrence, evidently because the decidedly objectionable character of the water prevented people from using it for drinking.

*Boating, Bathing and Fishing.*—The potential danger of contamination as the result of boating, bathing and fishing upon bodies of water serving as water-supplies is, of course, well recognized, although actual examples of epidemics resulting from infection as the consequence of such practices are difficult to cite. This is to be expected owing to the usually transitory nature of such contamination.

*Ice Cutting.*—The danger of contamination by men engaged in ice cutting upon water-supply reservoirs and ponds is also a hazard, the ill effect of which it is difficult to prove by actual examples. In 1917 there occurred an outbreak of typhoid fever in the city of Hillsdale, Mich., which was attributed to an infection of the city water-supply by a crew of men engaged in ice cutting upon the lake from which the supply was obtained.

In addition to the danger of contamination by men harvesting ice, there is also the danger from men removing ice from ice houses in the summer. Ice cutting itself is frequently carried on under sanitary inspection, but the removal of the ice is usually under no such supervision, and the danger may therefore be greater.

*Lumbering.*—Lumbering operations upon timbered watersheds are another hazard of relatively frequent occurrence, but one to which infection of water-supply has seldom been traced.

*Labor Camps.*—Labor camps, unless most careful sanitary oversight is maintained, also constitute a menace to water-supplies when located on watersheds. Two serious outbreaks of typhoid occurred some years ago in New York State which may have been due to infection by laborers in camps upon watersheds.

*Highways and Railroads.*—The infection of water-supplies by travelers upon highways and upon railroads is also a danger, of which definite examples are impossible to prove. You will recall the severe outbreak of typhoid in Scranton, Pa., in 1906, at which time considerable emphasis was laid upon the probability of infection of one of the reservoirs by excreta discharged from passenger trains which paralleled the reservoir and tributary watercourse for some distance.

*Cross-Cuts in Reservoirs.*—A condition with respect to pollution and possible infection, in the case of the smaller lakes and large reservoirs, consists of nullification of the beneficial effects of storage by the rapid transportation of polluting material from relatively remote points to the immediate vicinity of intakes by currents set up by various causes.

*Carriers on Watersheds.*—Although interconnected with other hazards, the possible existence of typhoid carriers upon watersheds is a factor worth considering. Examples of outbreaks of typhoid definitely traced to carriers upon watersheds are lacking so far as I have been able to learn.

*Accidents to Purification Plants.*—The installation of water purification works does not constitute an absolute safeguard against possible infection unless continuity of efficient operation is maintained. Accidents of one kind or another occasionally occur which result in the delivery of unpurified water to the consumers. One of the most striking accidents to a filter plant occurred to the Albany plant in 1913, when as the result of the highest recorded flood in the Hudson the filtration plant was inundated for a period of somewhat over a day and raw Hudson River water was pumped into the mains.

The filter plant was flooded early in the morning of March 28 and was out of service until about noon on March 29, or about 30 hours. When it was apparent that the filter was to be flooded, warnings against the use of unboiled water were issued through the press, but such warnings are futile and were evidently pretty generally disregarded. At the end of about two weeks, cases of typhoid began to be reported, and in all there occurred between 170 and 200 cases.

*Accidents to Intakes.*—In cases where

water-supplies are taken from large rivers or lakes receiving sewage pollution, but where the pollution extends in comparatively restricted threads of the stream or in limited portions of the lake, there occurs the hazard resulting from leaky intake pipes, should such intake pipes pass through the polluted portion of the body of water forming the source of supply.

*Improper Operation of Purification Plants.*—An example of the result of a

failure to properly operate a filter plant is the case of an outbreak of 13 cases of typhoid fever in the village of Massena Springs, N. Y., in the early part of 1917. The water-supply of this village is derived from a power canal fed by the St. Lawrence River. The supply is contaminated as a result of the general pollution of the St. Lawrence River, and at times from dredging operations above the intake. The supply is chlorinated and filtered through pressure filters. Just prior to the outbreak referred to, the filters had been out of service for about two months, and during the same period the chlorination plant was also out of commission.

*Exhaustion of Water Purification Chemicals.*—A danger which must always be borne in mind in connection with water purification plants using any chemical, is the possibility of supplies of the chemicals becoming exhausted before new supplies are available. This condition was acute during the war, when freight movements and deliveries were very uncertain. Furthermore, this condition is liable to be met with at any time of freight embargoes.

*Poor Quality of Chemicals.*—A somewhat similar hazard to that referred to above is that of using chemicals deficient in strength. This is more liable to occur with hypo-



AN ICE HOUSE ON A MASSACHUSETTS POND WHICH WAS USED UNPURIFIED AS A WATER-SUPPLY

chlorite of lime than with other chemicals used in water purification, because of its tendency to deteriorate on standing.

*Filter Plant By-Passes.*—Frequently by-passes are provided which permit the discharge of untreated water directly into the mains. For example, Geneva, N. Y., obtains its water-supply from Seneca Lake, about  $2\frac{1}{2}$  miles south of the point where the sewage of the city is discharged. Ordinarily the sewage flows out of the lake away from the intake, but under certain conditions of wind and lake currents it undoubtedly reaches the vicinity of the water-works intake. Purification by means of a slow sand filter plant has been provided, but during the latter part of 1917 it became necessary to by-pass a small amount of raw water around the filters on account of the inability of the filters to handle the entire water consumption of the city. Furthermore, when one of the filter units was out of service for cleaning, the amount of water by-passed became relatively large for several hours. This by-passing of raw water resulted in some 15 cases of typhoid in the city, which had become practically free from the disease after the installation of the filter plant.

(To be concluded in the March issue of THE AMERICAN CITY)

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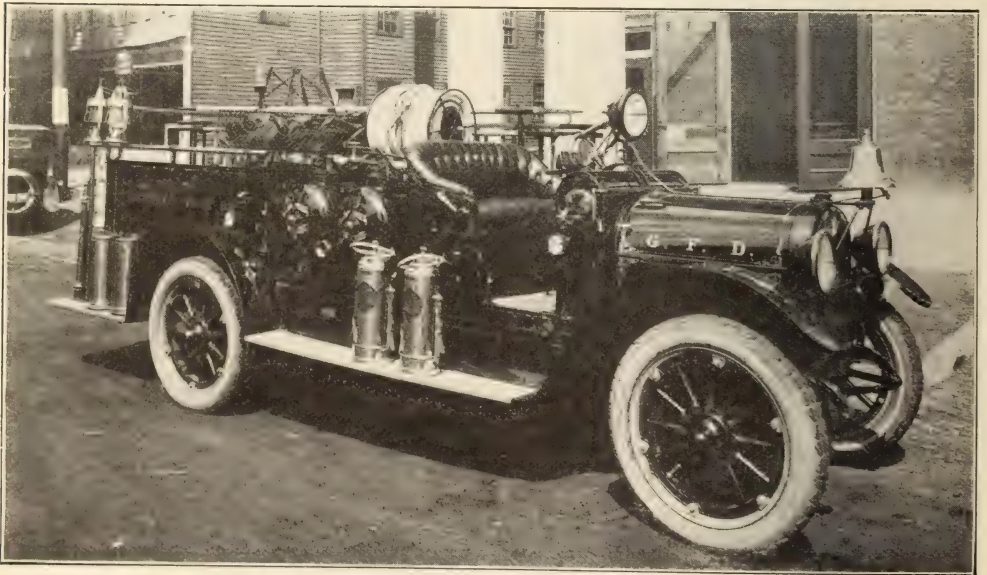
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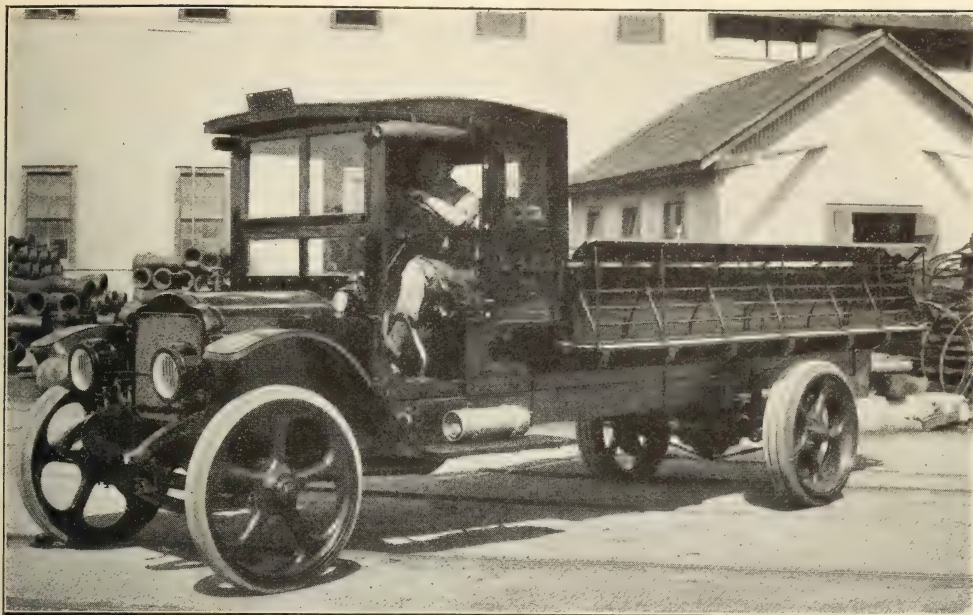
# Municipal Motor Apparatus Saves City's Time and Taxpayers' Money Throughout the Year



THE NEW AHRENS-FOX FIRE ENGINE IN SERVICE AT LONG BEACH, CALIF.  
Photograph furnished through the courtesy of G. C. Crow, Fire Chief, Long Beach, Calif.



A PROSPECT DELUGE CHEMICAL AND HOSE TRUCK USED BY THE VILLAGE OF  
GENESEO, N. Y.



**A 2-TON WHITE TRUCK USED IN GENERAL HAULING SERVICE BY THE SEWERAGE AND WATER BOARD, NEW ORLEANS, LA.**

This truck has a 168-inch wheel-base, which is something new for 2-ton trucks. Photograph furnished through courtesy of the New Orleans Sewerage and Water Board



**HANDLING THE 10-INCH SNOW OF DECEMBER 14 IN DETROIT**

The Universal crane shown removing the snow from the sides of the street was four miles outside the city when called for service and was in operation in Cadillac Square one hour and a quarter after starting from its parking place. It loaded one 5-ton truck with side-boards every 2 minutes through a 24-hour period. Three hundred trucks were loaded between noon and midnight. The handling of 1,500 to 2,000 yards of snow in 12 hours by this crane and Owen snow bucket was done so efficiently that the bucket did not mar the pavement in any way



# Chamber of \*\*\*\*\* Commerce Activities in Public Affairs

## Elementary School Conditions in the United States

WASHINGTON, D. C.—The Civic Development Department of the Chamber of Commerce of the United States has issued a preliminary report on surveys of school buildings and equipment and health and physical education in the elementary schools. The surveys of school conditions were made by 185 chambers of commerce in various parts of the United States.

The report contains many valuable suggestions as to present conditions and the proper development of school facilities. It shows that among the elements being developed in the communities which have the most modern school systems are:

1. Properly planned buildings rightly located and surrounded by adequate open spaces
2. Efficient health organization, including school physicians, dentists and nurses
3. Thorough medical examination of all children before admission to school
4. Provisions for nourishment not only for malnourished but for all elementary school children
5. Outdoor classes and schools
6. Health instruction and supervised play

It may be secured by addressing the Civic Development Department, Chamber of Commerce of the United States, Washington, D. C.

JOHN IHLDER.

## To Stimulate State-wide Interest in City Planning

MASON CITY, IOWA—With exceptional cooperation from Iowa State College, a comprehensive and practical plan for Mason City is in process of preparation by the City Planning Subdivision of the Chamber of Commerce. Rolland S. Wallis,

Municipal Engineer of the Engineering Extension Department of the College, has offered his own services and those of the Engineering Department, without compensation, to prepare the city plan of Mason City.

That the study will be a thorough one and the plan a real community enterprise is indicated by the fact that the following survey and planning committees have been appointed:

Zoning	Public Buildings
Transportation	Sanitation and Public
Parks and Playgrounds	Health
Housing	Industries
Street Traffic	Real Estate
Street System	Public Utilities
Street Details	Civic Art
Publicity	Nuisances
Law and Finance	

When the plan is completed it will be published as an official bulletin of Iowa State College. This is all being done for the purpose of stimulating interest in city planning in the state of Iowa. Mason City is taken as an example of the typical Iowa community. This service was offered after a request for help from the Chamber of Commerce and because of the great interest which has been evidenced on the part of Mason City in this subject.

H. M. VAN AUKEN,  
Secretary, Mason City Chamber of Commerce.

## A City's Pride in Its Shade Trees

ROSWELL, N. MEX.—Shade trees in a city surrounded by the open plains country of the Southwest have an appeal much stronger than in cities where the tree problem has been one of elimination rather than of production. Roswell has taken pride in its shade trees since the city was founded, in the eighties; in fact, the trees preceded the establishment of the city. A few cottonwood limbs were stuck in the ground along a ditch which carried water most of the year. They grew, and naturally the first little group of houses was built near these trees. Captain J. C. Lea, the pioneer of Roswell, deserves much of the credit for



A GLIMPSE OF ROSWELL'S FOREST

Even without foliage the branches of these city trees are thick enough to hide 325 homes, besides 3 churches and a school

additional planting. In the nineties he put out a hundred cottonwoods along the few streets which were then established. When Roswell began to see visions of becoming a city, these trees were of sufficient size to have their worth appreciated and the planting continued.

An abundant supply of artesian water has made the general growing of shade trees practical. The city government early saw the need of city supervision in the planting and protection of the trees. An ordinance was adopted giving the city entire possession of all trees outside the property line. A property owner cannot even cut off a limb without obtaining permission from the city authorities. Though the city owns the trees, the property owner plants them, waters them and pays for pruning. If trees were not prized so highly, this system, of course, would not work. but the city government meets practically no opposition from property owners.

The Chamber of Commerce about every second year promotes a tree-planting campaign, which increases the number of trees by 200 to 500. These plantings are encouraged in sections where new residence districts are starting and in the older sections

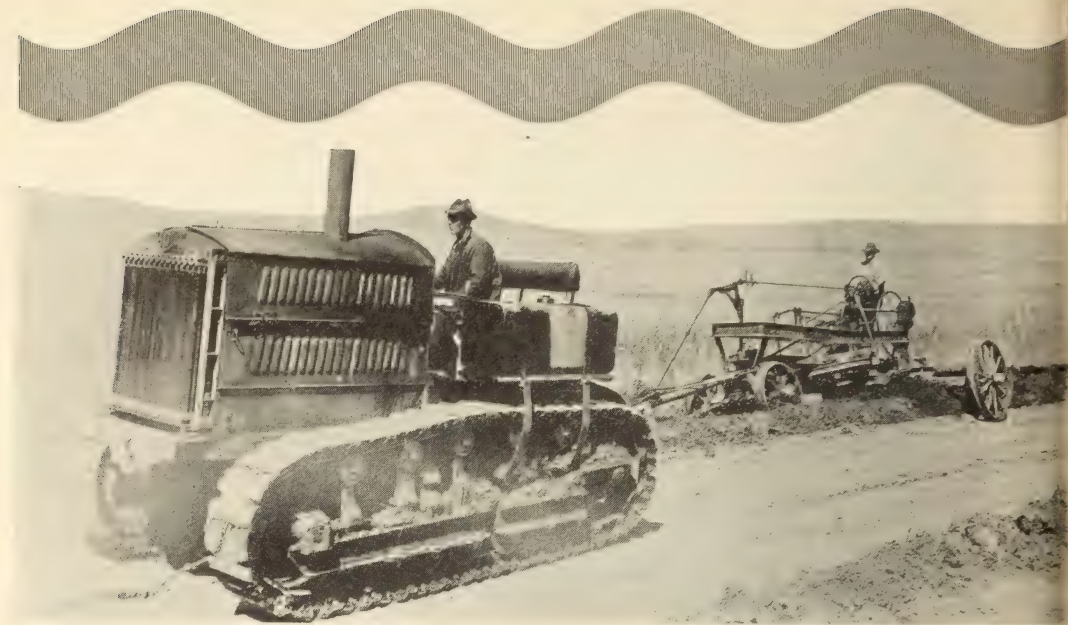
where the cottonwoods are approaching maturity. Recent plantings are mostly elms.

A recent incident shows something of the regard in which Roswell's shade trees are held. A new paving program covered streets where the trees were too far from the property line to come within the parking. The city ordered the trees cut down, and even though one of them was in the middle of a cross-street, dozens of property owners all over the city protested vigorously and advocated the laying of paving around the trees. In every case the city saw that new trees were planted to take the place of those removed.

The addition of seventy blocks now being made to the paved district of the city is resulting in an even larger planting of trees than in any of the last ten years. When side parkings are definitely established as a result of the paving, property owners immediately start grass and plant more trees. The new trees are planted in the proper location with respect to the boundaries of the parking. When these are large enough, the older trees, if not properly placed, will be removed.

CLAUDE SIMPSON,  
Secretary, Chamber of Commerce.





## Why Okmulgee Standardized on "Caterpillars"

*The "Caterpillar's"\* field of usefulness is by no means limited to road making. There is a "Caterpillar"\* of size and capacity for every power need. On farm or ranch, in the mining, oil and lumber industries, for snow removal and other civic work—wherever power and endurance are at a premium, the "Caterpillar"\* has no real competitor.*

**CATERPILLAR**  
Reg. U.S. Pat. Off.

**HOLT**  
PEORIA, ILL.  
STOCKTON, CALIF.

Okmulgee County, Oklahoma, lies in the center of a vast oil field, where pipe casings and boilers, weighing many tons, are continually hauled over the roads. This heavy freighting, which does not stop even in muddy weather, is a severe test of roads. After experimenting with other kinds of road building machinery, Okmulgee County Commissioners purchased a 10-ton "Caterpillar."\* Its performance resulted in repeat orders until Okmulgee now operates a fleet of nine "Caterpillars."\* The Commissioners write: "Since buying the "Caterpillars"\* we have graded and maintained hundreds of miles of roads in this county and the work has been done at approximately one-half the cost we have been able to do it with any other equipment." The "Caterpillar"\* method of handling public works of every kind is of interest to every county, township and city official. Our booklet, "The Nation's Road-Maker" will be sent on request.

*\* There is but one "Caterpillar"—Holt builds it. The name was originated by this Company, and is our exclusive trade-mark registered in the U. S. Patent Office and in practically every country of the world.*

**THE HOLT MFG. CO., Inc., PEORIA, ILL.**  
*Branches and service stations all over the world*

Eastern Division: 50 Church St., New York

Omaha, Neb.  
Kansas City, Mo.  
St. Louis, Mo.  
Holt Company of Texas,  
Dallas, Texas.

Chicago, Ill.  
Minneapolis, Minn.  
Indianapolis, Ind.  
Canadian Holt Company, Ltd.,  
Montreal.

## A Three-Year Campaign Against the Mosquito

NEWPORT, R. I.—For the purpose of controlling mosquito breeding, the Newport Chamber of Commerce has initiated a three-year program to clean up and drain all swamp areas adjoining the city. An oiling squad will be maintained under a competent director from May 15 to September 15, and a ditching gang will furnish permanent relief by draining all areas possible in the time specified.

This work is supervised by a committee from the Chamber working under the direction of an expert who has had years of experience in the business. During 1922 we expended \$4,500 on this work, \$3,000 of which was contributed by our summer residents and \$1,500 by the state of Rhode Island. Two plots of land, of 50 and 80 acres respectively, have already been reclaimed for cultivation.

The plan includes educational work among the school children, services of the Boy Scouts and Girl Scouts, and cooperation with the City Health Board.

W. C. CAMPBELL,  
Secretary, Newport Chamber of Commerce.

## Financing Escanaba's White Way

ESCANABA, MICH.—The first forum dinner of the Escanaba Chamber of Commerce, held October 19, marked the successful culmination of a campaign to raise \$12,000 toward financing one of the biggest and best-lighted White Ways in all the North Central States. The White Way Technical Committee of the Escanaba Chamber, appointed July 6, recommended in its final report to the Board of Directors at the first regular meeting in September a lighting system on 11 1/6 miles of our municipal business street, costing \$18,000. Of this sum the traction company agreed to furnish \$3,000 and the lighting utilities \$3,000, leaving \$12,000 to be raised by subscription from property owners and business men.

The plan recommended by the White Way Technical Committee provided a lighting system which has been assured without profit to jobber or retailer, without expense for engineering service, and with a saving of from \$10,000 to \$15,000.

The campaign to raise the funds was thoroughly organized, and resulted, in spite of the financial depression, in an over-subscription approximating 10 per cent. After

all collections are made and bills are paid, it is proposed to make a prorata refund to each contributor.

Members of the Chamber of Commerce are elated over the success of the campaign and are coming to feel that there is nothing beyond their reach if they really set out in an organized way to accomplish it.

ORREN I. BANDEEN,  
Secretary, Escanaba Chamber of Commerce.

## Troy's Industrial and Mercantile Exposition

TROY, N. Y.—At a Members' Smoker held on the evening of December 12, the final report of the Chamber's Exposition Committee was made, showing a total attendance of over 50,000 and a net profit of \$8,098.52.

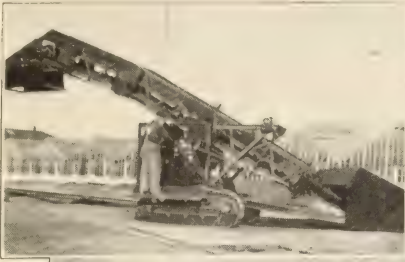
When the Industrial and Mercantile Exposition was conceived and organized by the Troy Chamber, there was no idea of making it a revenue-producing project. The one thought was to conduct the best exposition that could be brought together and to make sure that all expenses would be paid. The result has surprised even the most sanguine members of the committee, and the psychological effect upon the community is very great. The surplus funds may be used as the nucleus for a Chamber of Commerce building in Troy or for some project of a permanent and community-wide nature.

The exposition was staged in Troy's new armory, which was admirably suited for the purpose. On one night there was an attendance of over 7,000. During the exposition 10,000 school children were admitted free of charge.

More than a hundred exhibitors, representing the manufacturing, jobbing and retail interests of Troy and vicinity, took space in the armory. The general excellence of the displays was a matter of wide-spread comment and approval. The building line was defined and also the sky-line, so that the ensemble was symmetrical and exceedingly attractive. Every inch of space was sold two months ahead of opening day.

The affair was from first to last a Chamber of Commerce effort. President William C. Feathers appointed a special committee to have entire charge of the project. The committee was fortunate in being able to engage as general manager, James D. Fleming, a man of wide experience as a commercial traveler and business executive,





Moving a Barber-Greene Snow Loader, under its own power, for shipment as snow insurance for a mid-western city.



## Typical Reports From Eastern Cities

During the last six weeks a dozen cities have added Barber-Greene Snow Loaders to their snow-fighting equipment.

All those in the east, and some in the west, have had ample opportunity to demonstrate the value of the Barber-Greene in saving time and money.

Albany says: "On account of the labor shortage we could not have got anything done at all and the loader 'saved our lives'."

And: "It is over thirty times as fast as hand labor."

And: "With it we hung up a record of loading 45 trucks per hour."

Boston "L" officials say: "It replaces 150 to 200 men."

And: "We would not take \$50,000 for the Barber-Greene Loader if it could not be replaced."

The Barber-Greene is the first practical Snow Loader.

The most efficient method of using it is to plow the snow into windrows at the curb, loading from these with the Barber-Greene.

Its success is due to its design and to the fact that it is the product of a company that has for years specialized in material handling equipment, and has spent three years in perfecting the present model.

The new Model F, not only handles snow, but by means of a bucket boom can be converted into a bucket loader in summer time for loading sand, gravel, and the like.

Details about its work, performance, and construction will be freely furnished on request.

### Barber-Greene Company

Aurora, Illinois

Branch Offices in  
33 Cities

# BARBER-GREENE SNOW LOADERS



He had had a part in former expositions held in Troy and was thoroughly acquainted with the personnel of Troy's manufacturing establishments.

The exposition was advertised by posters and cards as far north as the Canadian line, west to Utica, south to Hudson, and east to Pittsfield, Mass. Thus the city of Troy and its products were brought before the eyes of thousands of people living in this large territory.

G. W. LEMON,

Managing Secretary, Troy Chamber of Commerce.

### Chamber Aids Social Service Federation

SOUTH BEND, IND.—The South Bend Federation for Social Service, which operates from the Chamber of Commerce Building, in which place it has its permanent headquarters with a paid executive in charge, asked for \$115,000 for its coming year's work, and secured \$117,798.25 with 14,275 individual pledges. In 1920, the amount asked was \$75,000 and the amount pledged was \$58,000 with 2,600 individual subscribers; in 1921 the amount asked for was \$99,150, the amount pledged was \$106,318, the number of individual subscribers being 11,827. The campaign is held in November of each year and covers the ensuing twelve months.

The South Bend Federation for Social Service is the outgrowth of the old War Chest which was organized by the Chamber of Commerce, but following the Chamber's policy in matters of this kind, permitting such organizations to function alone once they are going concerns, the Federation is now operating with a paid executive.

The campaign for 1921 and again this year was largely carried on through the use of the telephone. A battery of thirty-six phones was installed in the Chamber of Commerce Building, and these were used by women from nine in the morning until five o'clock in the evening, and by the men from six until nine o'clock at night. The men met at the Chamber at 5:30 o'clock and were served supper, leaving the table directly to operate the phone. Every household in South Bend was called, both the men and the women, the women being called by the women, and the men by the men. In addition, the factories were organized, as were the stores, by organizations within themselves which were directed by a factory

chairman and his assistants, and a commercial chairman and his assistants. The cooperating clubs of both men and women were pledged to provide at least thirty-six workers each day and night to care for the phones, and this was done.

We used full-page advertising in bringing the campaign to the attention of the people. This advertising was paid for out of the campaign funds, but we have been able to pay all of the cost of the distribution of the fund from the treasury of the Federation itself, through the interest secured on the money deposited in the banks.

The Federation for Social Service funds are distributed to twelve organizations. A person making a pledge may signify to which organization he wishes it to be assigned. No additional solicitation is permitted during the year. Budgets are presented and monthly statements are prepared and rendered before the monthly allotment is made.

FRANK J. GREEN,

Manager, South Bend Chamber of Commerce.

### City Planning in Grand Haven

GRAND HAVEN, MICH.—A carefully developed city plan has been worked out for Grand Haven, and the Chamber of Commerce is preparing an extensive educational campaign to insure its adoption at the spring election.

A City Plan Committee, made up of seven of the town's leading citizens, was named by the City Council several months ago with the thought that it might eventually develop into a legalized commission. It now seems certain that this end will be attained.

Lack of understanding as to the meaning of city planning prevailed here, as it does in all small centers, but it so happened that, coincident with the formation of this committee, a newly organized Chamber of Commerce was installed here by the American City Bureau and, through it, the city began growing industrially.

New business enterprises began springing up and the usual abuses occurred, such as location of small groceries and meat markets in the residential districts. Petitions to the Council to restrain such unrestricted development have served to advertise the city plan greatly, as each petitioner was informed by the Council that, once the city plan is in operation, such things would be taken care of automatically. At present,





# The MONARCH TRACTOR

*for* CITIES-COUNTIES  
and CONTRACTORS

**T**HE reason for the supremacy of the Monarch Industrial Tractor in the road building and road maintenance field is its consistency of operation. Nothing works more surely to show a profit to the city or to the contractor at the end of a job or in keeping road building costs down to a minimum than to have the tractor that is hauling the different kinds of road machinery always in operating condition and ready for instant service at all times. There are no off days, summer or winter, rain or shine, in the performance of the Monarch Tractor. Its simplicity of construction, accessibility and the high grade material and workmanship, make it the choice of the city and contractor.

**MONARCH TRACTORS**

INCORPORATED

**WATERTOWN**

**WISCONSIN**



because of this influence, it will be the purpose of the Chamber's campaign to educate the people thoroughly as to the various phases of city planning.

Harland Bartholomew, St. Louis engineer, has been engaged to complete and refine the local committee's plan.

FRED McCREA,  
Secretary, Chamber of Commerce.

### Trenton Studies Its Schools

TRENTON, N. J.—Trenton's school problems were discussed at a community mass meeting held under the auspices of the Chamber of Commerce. A thorough investigation of school conditions had previously been made, at the request of the Chamber, by the chief investigator of the U. S. Bureau of Education, and in the mass meeting the recommendations of the Federal Bureau were submitted. The State Commissioner of Education and a number of well-posted local speakers took part in the program. The theater in which the meeting was held, and which accommodated 1,000, was filled to capacity and several hundred were turned away.

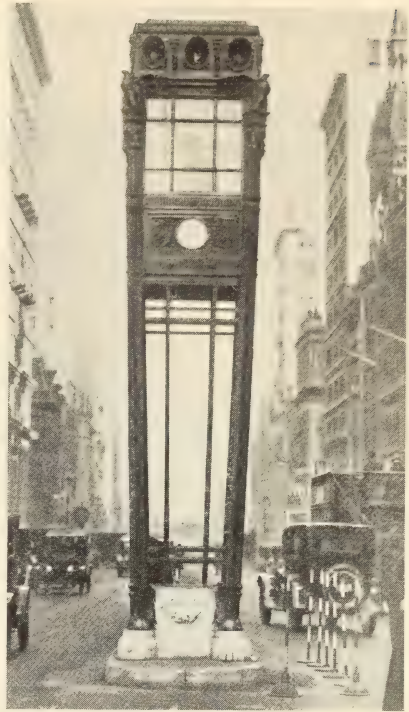
WALTER O. LOCHNER,  
Secretary, Trenton Chamber of Commerce.

### New Bronze Traffic Towers for Fifth Avenue

NEW YORK, N. Y.—Seven permanent bronze traffic towers have been presented to New York City by The Fifth Avenue Association for erection in Fifth Avenue. Five of the new structures will replace the present temporary towers, and two additional locations will be added to the system in order to extend tower regulation throughout the congested portion of Fifth Avenue.

The first of these towers was presented to Mayor Hylan on December 18, 1922, and is now in active operation at Fifth Avenue and 42nd Street, as "master tower" whose signals control and are followed by the entire system.

Each tower is mounted on a solid granite base 4 feet square and 3 feet high. The towers are 23 feet in height. They are constructed almost entirely of bronze after a design selected in open competition under the rules of the American Institute of Architects, from 130 designs which were submitted by architects throughout the country. Each tower has two clocks, one facing north and one facing south. Each is equipped with a bronze bell weighing 350



NEW FIFTH AVENUE TRAFFIC TOWER

pounds, which will strike at noon and midnight. The space at the top where the traffic policeman stands is enclosed with glass windows and heated by electric stoves.

The tower system of traffic regulation originated on Fifth Avenue, upon the recommendation of Special Deputy Police Commissioner John A. Harriss. It has worked so well that the Board of Estimate appropriated \$250,000 for extending it in other congested streets throughout the city.

CHARLES H. ROBINSON,  
Assistant Secretary, The Fifth Avenue Association.

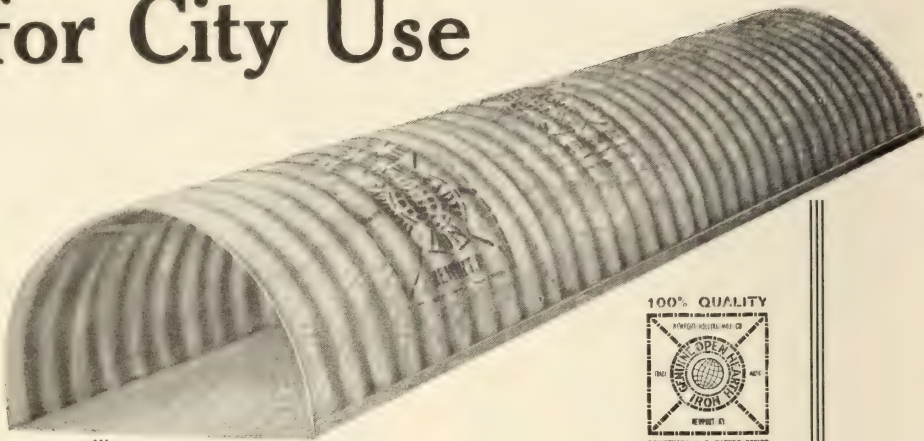
### Chamber Purchases Park Land

MIDDLETOWN, N. Y.—The Chamber of Commerce has purchased and will present to the city  $2\frac{1}{2}$  acres of land in the heart of the city for park purposes. The land adjoins another tract of two acres presented to Middletown by a public-spirited citizen. This will give the city a  $\frac{1}{4}$ -acre park occupying a slightly knoll commanding a view of the surrounding country for miles. The idea of the gift was to further the Chamber's park program by a practical demonstration.

ALAN C. MADDEN,  
Manager, Middletown Chamber of Commerce.



# Half-round Culverts for City Use



**T**HIS type of rust-resisting culvert is particularly adapted to city and small town use where there is not sufficient headroom for the installation of the full-circle type. It has the further distinct advantage of being easily cleaned in case an obstruction causes a stoppage.

Newport Culverts are made of **GENUINE OPEN-HEARTH IRON**, guaranteed to be 99.875 per cent pure iron copper alloy. The corrugations furnish the strength and the rust-resisting metal, the endurance.

*Send for booklet giving complete data  
on NEWPORT CULVERTS made of  
"GENUINE OPEN-HEARTH IRON."*

## NEWPORT CULVERT COMPANY

542 West Tenth Street,

Newport, Kentucky

# City-County Consolidation in Montana

By P. L. Wills

Secretary-Manager, Butte (Mont.), Chamber of Commerce

**"M**ONTANA can set the standard for the entire nation in creating efficient types of city and county government under its recently adopted constitutional amendment permitting county home rule and city and county consolidation."

Thus Dr. A. R. Hatton of Western Reserve University, Cleveland, nationally recognized authority on municipal administration, has predicted a new distinction for the Treasure State—this time, leadership in modern government. Nearly three years of persistent work on the part of the Butte Chamber of Commerce has made Dr. Hatton's prediction possible.

Ninety-seven per cent of the people of Silver Bow County, the smallest, richest and most populous county in Montana, live within three miles of the center of Butte; yet for half a century two forms of government, city and county, have functioned side by side in administering the affairs of practically the same group. Duplication of expense, overlapping of activities, waste and inefficiency, have been the results from which the taxpayers have suffered grievously. But not until the adoption of the new constitutional amendment by a majority of 17,000 at the November election has it been possible to correct this condition.

The Butte Chamber of Commerce, which adopted city and county consolidation as its major program on reorganization three years ago, has "seen the amendment through" as the preliminary part of that program. Bringing about its introduction through an expert committee, securing its submission to the voters of the state through the Legislature, and then working for its adoption through a carefully planned, state-wide publicity campaign, the Chamber has had more than a casual part in the enactment of the amendment, declared to be one of the most far-reaching pieces of legislation of its kind.

The new amendment, which gives Montana greater freedom in working out its local county problems than that now possessed by any other state in the union,

not only was framed to meet the needs of Butte and of other cities that may desire consolidation, but also makes special provision for those counties desiring to adopt a managerial form of government or to make any other changes in their administrations needed for economy and efficiency. Thus it is of double interest to those concerned in municipal progress. The amendment, drafted in a large measure by E. B. Howell, municipal consultant of the Chamber of Commerce, follows:

"The legislative assembly may, by general or special law, provide any plan, kind, manner or form of municipal government for counties, or counties and cities and towns, or cities and towns, and whenever deemed necessary or advisable, may abolish city or town government and unite, consolidate or merge cities and towns and county under one municipal government, and any limitations in this constitution notwithstanding, may designate the name, fix and prescribe the number, designation, terms, qualifications, method of appointment, election or removal of the officers thereof, define their duties and fix penalties for the violation thereof, and fix and define boundaries of the territory so governed, and may provide for the discontinuance of such form of government when deemed advisable; provided, however, that no form of government permitted in this section shall be adopted or discontinued until after it is submitted to the qualified electors in the territory affected and by them approved."

With constitutional obstacles removed, securing the enactment of legislation providing for the consolidation of the governments of the city of Butte and the county of Silver Bow under a commission-managerial administration, is the next number on the Chamber's program. And after the approval of the State Legislature has been obtained, during the coming session, there will still remain the final and perhaps the most difficult step—that of bringing about the adoption of the consolidation charter by the people of Silver Bow County at a special election this spring.

Unhampered by constitutional restrictions, Butte will seek, with Dr. Hatton's assistance, the best form of municipal administration possible. Under the proposed new charter eleven school districts will be unified, the





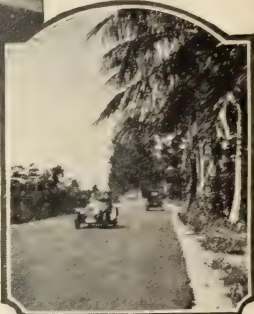
Gulf Beach Drive,  
Ocala,  
Tarvia over Florida  
lime rock.



Clematis Ave., West Palm  
Beach. Tarvia treated.



Sutherland, Fla.  
Tarvia over Florida lime rock.



A typical section of Tarvia  
surface on the famous Dixie  
Highway, Palm Beach County.

## Tarvia Roads in Florida—

By no means the least of the attractions that make Florida the "Winter Paradise of America" are the smooth dustless highways that connect the many coast and inland resorts. Many of them are Tarvia roads.

In building these highways the road officials are confronted by unusual conditions. The roads must stand up, with small maintenance cost, not only against heavy traffic but also against the summer rainfall and tropical climatic conditions.

The constantly increasing use of Tarvia in all sections of the State proves how satisfactorily Tarvia roads are meeting these requirements. Today, in Volusia, Brevard, Palm Beach,

Duval, Pinellas and other counties, Tarvia roads are adding alike to the pleasure of winter tourists and to the comfort and prosperity of the year-round residents.

Because of their moderate first cost and easy and inexpensive maintenance Tarvia roads always permit a more extensive good roads program than is possible with any other type of modern highway construction.

Our highway engineers are at the service of any community desiring better and more economical roads.

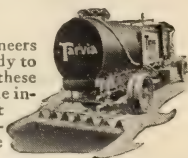
*Illustrated booklets describing the various grades and uses of Tarvia will be sent free on request.*

# Tarvia

**For Road Construction  
Repair and Maintenance**

### Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by anyone interested. If you will write our nearest office regarding road problems and conditions in your vicinity, the matter will be given prompt attention.



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THE BARRETT COMPANY, Limited.

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Vancouver

St. John, N. B.

Halifax, N. S.

city library system made county-wide, and city and county governments united, effecting a minimum saving of \$500,000 a year. A special bill for optional county home rule under the managerial form will also be submitted to cover the conditions and requirements of rural sections of Montana.

There is no model after which the new Butte city-county charter can be patterned. "The situation presents problems heretofore unattacked. That is why I am particularly interested," declares Dr. Hatton, who has

written most of the modern municipal charters drafted in the last five years. "Other cities have adopted managerial administrations; other cities and counties have merged. But they have only partly succeeded in obtaining the fullest measure of efficiency, economy and responsibility in government; they have gone only part of the way. Apparently nothing stands in the way of Montana in attaining results that other states cannot hope to secure for two years at least."

## Library Expenditures, Circulations and Branches

THE AMERICAN CITY is indebted to George F. Bowerman, Librarian of the Public Library of the District of Columbia, for the accompanying table, which is reproduced from Dr. Bowerman's

last annual report. The figures given cover cities above 200,000 population, the data having been compiled partly from published reports, but also in large part by direct application to the libraries.

Cities (ranked according to population)	Population.	Expenditures. 1921 or 1922.	Per capita expenditures.	Home circulation (volumes).	Expenditure per volume circulated.	Per capita circulation (volumes)	Number of branches.	Branches housed in separate buildings devoted exclusively to library purposes.
New York City....	5,744,914	\$2,287,370.52	\$0.398	18,266,644	\$0.125	3.18	90	72
New York Public <sup>1</sup> .....	2,176,558	1,254,417.03	.395	10,226,366	.123	3.22	43	42
Brooklyn.....	2,018,356	779,350.87	.386	6,072,707	.128	3.01	27	23
Queens..... <sup>2</sup>	550,000	253,602.62	.461	1,967,571	.129	3.58	20	7
Chicago.....	2,701,765	853,876.97	.316	7,472,768	.114	2.76	35	5
Philadelphia.....	1,823,779	426,445.00	.234	3,992,278	.107	2.19	28	27
Detroit.....	993,678	822,696.89	.828	2,996,771	.274	3.01	16	16
Boston..... <sup>2</sup>	822,000	734,892.07	.894	2,672,646	.275	3.25	31	12
Cleveland.....	796,841	859,269.06	1.078	4,672,252	.184	5.86	52	18
St. Louis.....	772,897	392,276.70	.507	2,308,533	.170	2.99	13	6
Baltimore.....	733,826	255,831.56	.349	863,765	.296	1.18	23	22
Los Angeles..... <sup>2</sup>	700,000	408,296.68	.583	3,603,181	.113	5.01	40	8
Pittsburgh..... <sup>2</sup>	600,000	496,468.89	.827	2,124,125	.234	3.54	9	9
Old City Allegheny.....		422,954.43		1,632,385			8	8
Milwaukee.....	538,469	246,214.85	.457	2,199,359	.112	4.08	11	3
Buffalo.....	506,775	218,049.75	.430	2,049,082	.106	4.04	7	1
San Francisco.....	506,676	200,357.48	.395	1,588,173	.126	3.13	9	9
Cincinnati..... <sup>2</sup>	493,678	292,757.80	.593	2,083,420	.140	4.22	24	14
Washington.....	437,571	152,091.00	.347	1,018,414	.149	2.33	1	1
Minneapolis..... <sup>2</sup>	415,419	283,957.43	.683	1,465,591	.194	3.53	16	10
Newark.....	414,524	219,115.00	.528	801,116	.273	1.93	1	1
New Orleans.....	387,219	62,892.80	.162	454,380	.138	1.17	5	5
Kansas City..... <sup>2</sup>	350,000	213,896.29	.611	1,125,261	.190	3.21	13	2
Seattle.....	323,124	288,702.01	.893	2,097,858	.138	6.49	9	8
Indianapolis.....	314,194	256,893.12	.818	1,191,981	.215	3.79	18	11
Jersey City.....	298,103	152,870.26	.513	1,347,638	.113	4.52	7	2
Rochester.....	295,750	115,213.08	.389	1,228,252	.094	4.15	7	1
Louisville..... <sup>2</sup>	286,369	130,306.08	.355	1,207,348	.108	4.22	12	9
Portland..... <sup>2</sup>	275,898	274,446.76	.995	2,037,545	.135	7.38	17	11
Columbus..... <sup>2</sup>	275,000	48,250.00	.175	334,112	.144	1.21	0	0
Denver.....	256,491	122,425.04	.477	1,121,717	.109	4.37	8	8
St. Paul..... <sup>2</sup>	250,000	219,917.85	.880	1,385,000	.159	5.54	4	3
Toledo.....	243,164	113,703.31	.467	1,103,371	.103	4.54	7	5
Oakland..... <sup>2</sup>	240,000	147,841.68	.616	1,036,857	.142	4.32	13	4
Providence.....	237,595	203,450.44	.856	685,949	.296	2.89	5	1
Atlanta.....	200,616	64,925.00	.324	437,062	.148	2.18	5	3
Totals and averages.....	23,236,275	11,565,701.37	.498	76,972,449	.150	3.31	536 16.75	307 9.59

<sup>1</sup> Circulation Department only.  
<sup>2</sup> Estimated.

<sup>3</sup> City and county.



# Ornamental and Efficient Street Lighting



## General Electric Novalux with *Holophane Dome Refractor*

A combination of ornamental appearance and efficiency. The outer globe gives size and appearance while the Holophane Dome Refractor over the lamp distributes the light with the usual Holophane efficiency.



HOLOPHANE GLASS CO. Inc.

Dept. A. C.-2, 342 Madison Ave., New York

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Toronto.

# Street Lighting with Mazda Lamps\*

By R. E. Greiner

Street Lighting Specialist

## Park Lighting

**P**ARK lighting is a phase of outdoor illumination which is of considerable magnitude and without doubt a necessary element of park layout. The walks and roadways in parks should not be as brilliantly lighted as a street proper, except in cases of heavily traveled thoroughfares within the park areas. A certain sense of

Lighting standards, even more, should exhibit intelligent design, pleasing in proportion and lines. Much has been accomplished in park lighting in the last few years, but there is still room for a great deal of improvement. Good practise in park lighting demands ornamental fixtures. These may be obtained in different forms which harmonize well with the various



A RADIAL WAVE STEEL REFLECTOR WITH PORCELAIN SURFACE, USED IN SUBURBS OF NEWBURGH. N. Y.

duskiness within a park is very desirable of a summer evening and can well be allowed in so far as may be found to be compatible with order in the park.

It is a foregone conclusion that in a park which is to be developed to the highest artistic standard, the appurtenances of the park should be designed for beauty of individual detail. In the development of parks in foreign cities, even the receptacles for waste paper are designed conscientiously.

park designs. One very effective design of lighting unit is in the form of a lantern (either mounted on a pedestal or suspended from an ornamental mast arm). Other types, such as shown in the first illustration, make very desirable means of illumination for this purpose; both the diffusing and refracting types of luminaires find application.

The placing of the lighting standards should be determined with regard to an even distribution of light and at the same time with reference to the lines of the park

\* Continued from January issue.





The personal interest  
of our workmen is  
reflected in the  
quality of  
King White Way Posts

PRIDE, as well as the skill of our  
men, goes into each and every  
King White Way Post.

A careful examination of King White Way Posts will reveal to you that they are a work of art, wrought by those skilled in producing Ornamental Street Lighting Equipment.

It would be a pleasure to take you through our factory where you could see how much care we give our products during the process of manufacture.

Each workman realizes that in allowing nothing but first class workmanship and material to pass through our plant; that he is carrying out fully, the policy of this institution in producing "King Quality" White Way Posts.

We probably can be of real service to you in making recommendations and laying out a street lighting system for your business district, residence sections, or along your parks and boulevards.

It is always our pleasure to give any community the advantage of our many years experience as street lighting specialists. Write us today about your contemplated street lighting improvements.



King Manufacturing Co.  
St. Joseph, Mo. Chicago, Ill.

design. It is obvious that lighting standards should not be so placed as to interfere during the day with view or vista and thus become a distracting element in the park design; in formal parks, in fact, they may be made to serve as a very helpful accent to the design and should be used for this purpose by the park designers, much as ornamental fixtures are used by architects in the composition of the buildings. Ornamental standards may be obtained in various designs to fit in with the different classes of landscape architecture.

#### SIZE AND SPACING OF UNITS FOR PARK LIGHTING

Type of Unit	Size of Lamp		Spacing Feet	Mt. Ht. Feet
	Lumens	C.P.		
Ornamental with refractors:				
	2,500-4,000-6,000	250-400-600	100-200	12-20

#### The Lighting of Boulevards

Every city prides itself on having one or more stretches of well-paved streets through the best section of the town, providing a promenade for automobilists. These streets, or boulevards, as they are called, are very popular with car owners, resulting in a heavy flow of traffic, particularly in the evening.

To provide safe conditions on the boulevard requires a high level of illumination. Enough light should be provided to elimi-

nate the necessity of bright headlights on the cars. In this way the great nuisance of glaring headlights is avoided. The driver can readily discern objects in his path, and is able to see accurately and quickly, thereby reducing accidents to a minimum. Traffic is also handled much more readily and speedily under the higher intensity of illumination, thus increasing the capacity of the boulevard.

The lighting of boulevards is accomplished with some form of ornamental unit in keeping with the character of this class of street. In some cases, a pendant type unit with diffusing globe has been used.

In regard to the locating of the light sources, it is found that these streets generally require a row of units hung or mounted along either curb. Some boulevards of a more formal character have a narrow parkway through the center of the street. Under these conditions the lighting units may be mounted in a single row along the parkway. This arrangement is economical of light, and very good results have been obtained.

#### SIZE AND SPACING OF LAMPS FOR BOULEVARDS

Type of Unit	Size of Lamp		Spacing Feet	Mt. Ht. Feet
	Lumens	C.P.		
Pendant.....	4,000-6,000	400-600	100-200	20-25
Ornamental..	4,000-6,000	400-600	100-150	15-20



HIGHWAY LIGHTING UNIT SHOWING NESTED PARABOLA CONSTRUCTION AND POLE EXTENSION





(c) **How 10,000 Actually Heard  
Governor Donahey's Inaugural Speech**

When Victor Donahey, Governor elect of Ohio, was inaugurated his speech was heard by over 10,000 people grouped about the Capitol in Columbus.

This huge audience was able to hear every word clearly and distinctly by means of a

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Public Address System**

There is a system to meet every requirement of municipal fire, police and educational departments where the clear, distinct and instantaneous transmission of information is essential.

Write for Bulletin 672-CC. It gives full details of indoor and outdoor equipment-products of an organization that has been making and distributing reliable communication equipment since 1869.

Since  
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New York City



DAY VIEW OF AN INSTALLATION OF HIGHWAY LIGHTING UNITS ON CAUSEWAY BETWEEN MIAMI AND MIAMI BEACH, FLA.

These 2,500-lumen lights are spaced 300 feet apart and mounted 30 feet high

### Outlying Suburban Sections, Alleys and Side Streets

In the thinly settled residential sections in the suburban districts, street lighting becomes mainly an economic problem. The houses are spaced quite widely, with sometimes a whole block left vacant. It is evident, however, that all these streets must be lighted to provide safe conditions for those persons living beyond and around these unsettled areas. Future developments also require that some light be furnished.

An often-overlooked consideration in street lighting is that of illuminating alleys and unimportant side streets. Insufficient attention is paid to this form of lighting, making these byways a menace to public safety. That some light should be furnished is quite evident. A high intensity is not practical or necessary. Enough illumination should be provided, however, to eliminate dense shadows and make patrolling convenient.

To accomplish the lighting of these streets satisfactorily, a lighting unit of low cost must be used. A wide distribution of light must be obtained, to allow as few units as possible. The unit itself should be of the bracket type for streets, and of center suspension for alleyways. A porcelain radial wave reflector meets the requirements very well. The reflecting surface is non-deterio-

rating and has a high reflective power, re-directing the upward rays of the lamp back to the street surface. The long life of this sort of fixture tends to make it quite popular for this form of lighting. Then, too, as the outlying districts are built up, the brackets may be replaced by larger units and moved further out and again put into use. Steel reflectors with a white porcelain enameled reflecting surface are also used quite extensively for this class of street.

### SIZE AND SPACING OF LAMPS FOR ALLEYS AND SUBURBAN SECTIONS AND SIDE

Type	Size of Lamps		Spacing Feet	Mt. Ht. Feet
	Lumens	C.P.		
Porcelain or steel radial wave:	1,000	100	50-100	12-15
Dome radial wave:	1,000-2,500-4,000	100-250-400	100-150	13-20
Band refractor types:	1,000-2,500-4,000	100-250-400	100-300	15-22

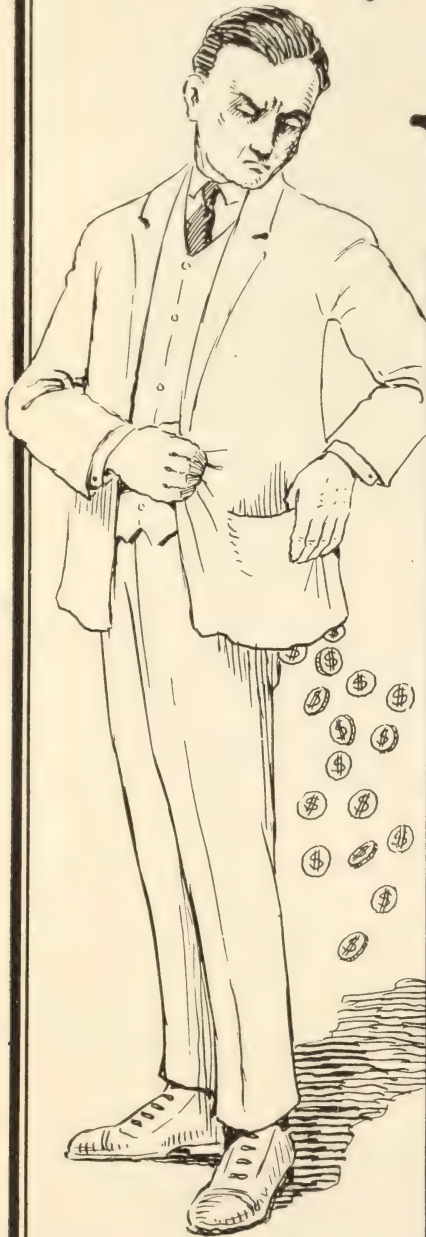
Note.—Lamps of less than 1,000 lumens output are not generally economical for street lighting.

### Highway Lighting

The ever-increasing amount of traffic over our main highways has so congested them that the need of some means of relief has become acute. The number of cars on some of the metropolitan highways has swelled to such a volume that there is a continual procession of automobiles, especially during the evening hours; and while the number of vehicles upon the highways has increased so materially, the capacity of the highways



# The Hole in Your Pocket—



—is a drain on your finances. A nickel, a dime or a quarter slips through and perhaps you do not notice it, but when you come to check up at the end of the month, you find that many dollars have been lost. The same is true when water departments try to check up the amount of water delivered to the mains and the amount actually used by consumers. They find there have been losses that are hard to account for.

## A PITOMETER SURVEY

definitely locates the losses from blown joints, broken mains, neglected valves and the illegal use of water, as well as the underregistration of large meters. It makes a strict accounting for water delivered and greatly increases the income of the water department making every drop of water produce revenue. We shall be glad to send you a list of cities in which Pitometer water waste surveys have been made and complete data regarding the surveys on request.

**THE PITOMETER CO.**  
52 CHURCH ST., NEW YORK CITY

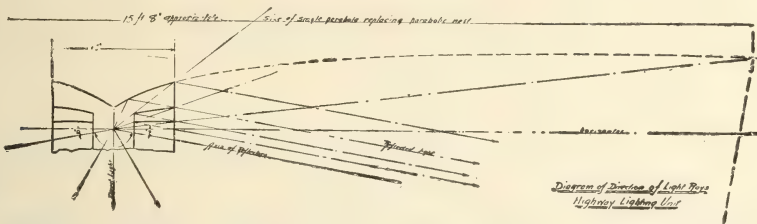
has remained practically constant.

As a direct result of this congested condition, there has been a considerable increase in the number of serious accidents happening upon our main highroads. Precautions have been taken to protect the traveling public by posting all sharp curves, narrow bridges, steep grades and the like. The protection afforded by this means does not, however, extend adequately beyond the hours of daylight, when the automobiles have to depend entirely upon their headlights. While recent improvements in headlamps through the enforced use of proper lenses and sizes of lamps has greatly improved night driving from a safety standpoint, there is still considerable objection-

higher speed. The seriousness of a collision or accident to a vehicle of this nature would be great, and every possible means should be taken for the protection of the traveling public.

Another danger of night driving is present in the form of hold-ups or robberies. During the last three or four years there has been a great deal of activity along these lines, until in certain sections of the country no one stops to render assistance when requested, for fear of being waylaid.

The severe requirements for highway lighting make it a very difficult problem to solve. One of the most important considerations is cost. It is obvious that as few units as possible should be used to provide



SKETCH SHOWING DIRECTION OF LIGHT RAYS AS CONTROLLED BY HIGHWAY LIGHTING UNIT

able glare present. The cause of a large percentage of night fatalities has been the inability of vehicle drivers to perceive pedestrians on the highway at a safe distance to avoid collision.

The increasing number of trucks operated on all-night schedule has added another danger to night traffic. They move comparatively slowly and are generally equipped with less efficient headlamps than are passenger cars. This means a general slowing up of the entire traffic along the highway, and also seriously augments the possibility of collision. Because of the inadequate illumination afforded by headlights, the driver is also liable to strike obstructions or holes and do considerable damage both to the truck and to the highway. Quite often the driver, not being able to make out the outline of the road clearly, runs off the road-bed onto the side of the road, which, being of poorer construction, cannot stand the weight thrust upon it.

Night traffic is also increased by the large number of passenger busses operating between cities. These are of considerable size and come under the truck classification, although they are essentially of a

sufficient illumination for safety. There should be such illumination upon the roadway as to enable the driver to see pedestrians or obstacles in his path at a safe distance, and the outline of the road at all times. Enough light should be provided to eliminate, as far as possible, the glare from approaching cars. Dangerous curves, steep grades and narrow bridges to be properly protected at night must be readily visible.

Only recently have any improvements been made in highway lighting to bring up the standards to conform with the exacting requirements. A highway lighting unit has been designed by the General Electric Company which gives a very satisfactory illumination for this purpose. This unit, which is called the Novalux highway lighting unit, is designed especially for use with a 250-candle-power lamp. The light given off by this lamp is collected by two sets of nested parabolic reflectors and concentrated upon the highway in both directions, no light escaping upward or to the surrounding fields. The efficiency of this unit is so great as to give a very satisfactory light with a spacing of 300 feet, or 18 to the mile. Spacings as high as 600 feet have been tested, but gave



## What Are You Doing to Protect Your Shade and Ornamental Trees?

NOW is the time to insure the health and beauty of your shade and ornamental trees, shrubs and vines. Many of their ills are controlled by the use of Scalecide as a dormant spray applied just before the leaves come out in the spring. It has been the standard spray for parks and cemeteries for nearly 20 years, and is known the country over as

### "The Complete Dormant Spray"

Scalecide is economical to use because it goes so much further than lime sulphur, and it is easy and pleasant to apply. It does not injure the hands or face—in fact it is harmless even to the eyes. Nor does it mar the paint on buildings, trellises and fences.

Scalecide has been used for years by the park departments of Brooklyn and Bronx, New York; Boston; Buffalo; Rochester; Detroit; St. Louis; Oak Park, Illinois; Highland Park, Michigan; Milwaukee and many other cities noted for their well-kept parks.

Cottony Maple Scale and Lecanium Scale are easily controlled with Scalecide, one thorough spraying often being sufficient for two or three years. The fungicidal action of Scalecide helps to prevent decay and the entrance of disease in pruning wounds and other injuries to the bark—and many cankers start healing up. Scale insects, often very injurious to conifers, can be effectively controlled with entire safety by spraying with Scalecide in the spring just before new growth starts. Even Spruce Gall has given way to thorough treatment with Scalecide.

Write us at once for complete information about Scalecide, "The Complete Dormant Spray." Please address Dept. 42

B. G. PRATT CO. 50 Church St. NEW YORK CITY

# SCALECIDE

THE COMPLETE DORMANT SPRAY

# SCALECIDE

less effective illumination even when used with correspondingly higher-powered lamps. The unit is mounted on poles along the edge of the highway at a hanging height of at least 30 feet. This height must be used to assure good distribution and to avoid glare. An adjustment of the units may be made to take care of the ordinary variations on pole positions and road curvatures. A modification of the pole type may be obtained by overhead suspension.

Extensive demonstrations and installations which are now in use have shown that with the recommended spacing and lamp size the highway is very satisfactorily lighted with rather more illumination than is found on most residence streets in cities. While traveling beneath these units, it is found possible to drive with simply dim

lights. With bright headlights the glare is reduced to such an extent as to make driving conditions comfortable and safe. The illuminated road stretches away in front of the car, presenting the appearance of a broad band of light, and shows up any objects or irregularities which may be present. Drivers are able to judge distances much more accurately under the well-lighted condition. This is conducive to confidence on the driver's part, consequently accelerating general traffic speed, and tends to increase the night traffic, thereby relieving the day congestion. It has also been found that upon a well-lighted road there has been practically no trouble caused by criminal activities.

Illustrations by courtesy of Edison Lamp Works, General Electric Company.

SUMMARY—STREET LIGHTING PRACTISE

Type of Street	Size of Lamps		Spacing Feet	Mt. Ht. Feet
Kind of Unit	Lumens	C.P.		
Main business section:				
Ornamental .....	6,000-25,000	600-2,500	60-150	14-25
Secondary business section:				
Ornamental .....	6,000-10,000	600-1,000	100-125	15-20
Pendant with refractor.....	6,000-10,000	600-1,000	100-125	20-25
Main thoroughfares:				
Ornamental .....	4,000- 6,000	400- 600	75-150	15-20
Pendant with refractor.....	4,000- 6,000	400- 600	100-200	20-25
Residential:				
Pendant (at corners) .....	2,500- 6,000	250- 600	200-350	15-20
Pendant (more closely spaced).....	1,000- 2,500	100- 250	100-200	10-18
Ornamental .....	1,000- 4,000	100- 400	100-250	10-16
Parks:				
Ornamental with refractor.....	2,500- 6,000	250- 600	100-200	12-20
Boulevards:				
Pendant or ornamental (refractors).....	4,000- 6,000	400- 600	100-200	15-20
Outlying suburban section, alleys and side streets:				
Refractors and radial-wave type....	1,000- 2,500	100- 250	100-250	15-20
Highways:				
Novalux highway unit .....	2,500	250	300	35

## Better Highways to Relieve City Congestion

THE highway engineer is needed sorely at this moment, the engineer with daring imagination, to help scatter the dwelling houses and residence facilities of cities of more than 25,000 population far and wide into the outlying open country, and thus in some appreciable way to relieve congestion in American cities.

A large factor in decentralizing city homes is the transportation problem, which challenges the genius of highway engineers. Less than one-third the entire population of the United States is on farms. Sixty-eight cities of more than 100,000 population each contain nearly another third. The thirty-odd millions of people living in cities of 25,000 population and over are being

brought into immediate contact with the commodities of living, the skill of service, and the institutional wisdom of the world, whereas those who live on farms receive few of these advantages.

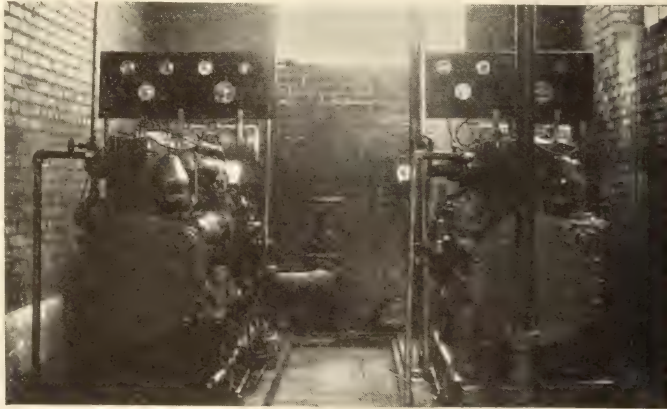
A system of complete terminal towns connected by rail or water with wholesaling cities, and by an adequate highway system to groups of farm population, is the solution for taking the curse off farming and "opening the door to a good kind of life on the farm."

—Dr. C. J. Galpin, U. S. Department of Agriculture, at Second Annual Conference on Highway Transportation Education.



# *Do these Conditions* **APPLY TO YOU?**

1. Are you paying the primary power rate?
2. Are you paying for power based on maximum demand?
3. Why not use a **STERLING** and purchase the secondary rate? Use the **STERLING** for peak load and for dependable standby. Pays for itself in about two years.



*Reserve pumps, two Lecourtenay centrifugals, driven by two **STERLING** engines for reserve at Neodesha, Kansas; Black & Veatch, Kansas City, Consulting Engineers.*

Catalogue on request.

## **Sterling Engine Company**

DEPT. C-11

**Buffalo, N. Y.**

**U. S. A.**

# Motor Car Accidents

Ontario Department of Public Highways Publishes Admirable Summary of Causes in Its Most Recent Annual Report

**M**OTOR car accidents may be divided into two classes—those which are unavoidable, and those which are avoidable. The driver of every motor vehicle, in spite of all skill and care, is subject to the possibility of an accident, and generalities with respect to placing the responsibility for accident on the driver of the car are unreasonable and unjust. The steering gear or other mechanism may get out of order or, when an adult pedestrian steps without warning from the curb directly in front of a moving car, no form of traffic regulation will prevent accident. Excessive speed is the most frequent cause of accidents.

The present speed law of Ontario permits a maximum speed within urban municipalities of 20 miles an hour, to be reduced to 10 miles at street intersections. With this speed is coupled the obligation placed upon the driver of a motor vehicle to drive with due care under all circumstances; therefore, on occasion a speed of five miles or any movement at all may be illegal. The former maximum speed of 15 miles an hour unduly limited the usefulness of the motor car and placed the driver in an unfortunate position legally, under the ordinary methods of speed enforcement. To overcome excessive speeding on city streets, a more rigorous enforcement of the present law should be applied, keeping motorists strictly within the speed laws. With this done, the speed limitations would be found adequate.

Too many accidents occur to children. The presence of children on a street should be a warning to the driver of a motor car to drive with extreme care. The horn should be sounded to warn children playing on the sidewalk that a motor car is approaching. Children absorbed in play are thoughtless and irresponsible and it is the plain duty of a driver of a motor vehicle to recognize these conditions. That a child runs from the sidewalk in front of a motor car is not always a sufficient excuse for an accident. For the driver of a motor vehicle, if he is competent to drive, should

know that children do such things and he should be reasonably prepared for the emergency. Accidents to children are in many cases an evidence of reckless driving.

Accidents to pedestrians are caused in a degree by an unfortunate attitude of mind which belongs to some drivers and which assumes that the pedestrian should get out of the way of the vehicle. Such a driver, instead of reducing speed and bringing his vehicle under sufficient control, merely toots the horn. Should the pedestrian fail to leap to safety or should he become confused, stand still or turn back, an accident results. The driver of a motor car should have his car under such control that the ordinary pedestrian is not endangered, particularly at street intersections.

On the other hand, some pedestrians are careless and unreasonable in their attitude to motor cars. They loiter on the roadway and in front of motor cars to a degree that invites accidents. They are willing to accommodate themselves to other pedestrians or to horse-drawn vehicles, but in the case of motor cars their mental attitude is one of antagonism. They ignore the fact that the movements of pedestrians are much more readily controlled than that of a motor car. Were pedestrians to exercise more care in leaving the curb, and were motorists to remember that pedestrians, particularly children, are apt to leave the curb carelessly, the number of accidents on city streets would be much reduced.

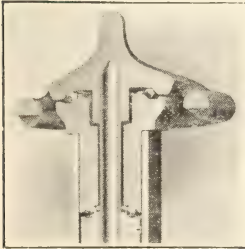
Glaring headlights are a fruitful cause of accidents, particularly on country roads, and a simplified method of determining and overcoming glare is greatly to be desired in order that the anti-glare law may be more effectively enforced.

On country roads excessive speed is still the most prolific source of accidents. Passing other vehicles on hills and curves and at intersections where vision is interrupted is merely evidence of the desire for speed in its most dangerous form. There is need that all main highways be patrolled by officers on motor-cycles in order that reckless driving may be prevented.

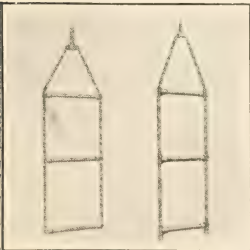




## Safety, Service and Durability are Exemplified in the Medart Giant Stride



Twenty-five ball bearings at top and thirteen below afford a frictionless, indestructible bearing.



Medart Giant Strides are equipped with steel ladders. Rope ladders can be substituted at slight additional cost.

EACH piece of MEDART Playground Apparatus has some outstanding features in design and construction which make for greater Safety, greater Service and greater Durability. For example, in the MEDART Giant Stride, the most important feature is the head-piece. It is made with a double set of ball bearings—25 balls at the top and 13 below. This construction allows it to turn smoothly without friction—resists wear—and equalizes the strain no matter from what angle applied.

## MEDART PLAYGROUND EQUIPMENT

As a consequence of such features of recognized superiority, MEDART Equipment has been, for 50 years, the first choice of civic officials, physical directors, school boards, and others entrusted with the purchase of playground apparatus. MEDART prices are much lower than you would expect for apparatus of such outstanding merit.

### Send for Catalog "M-6"

It illustrates the full line of Medart Playground Equipment. Also contains information on playground planning, based on our long experience in this work. This catalog sent free on request.

## FRED MEDART MFG. CO.

Potomac & DeKalb Sts.

New York, 52 Vanderbilt Ave.

Chicago, 326 W. Madison St.

St. Louis, Mo.

Kansas City, Lathrop Bldg.

San Francisco, Rialto Bldg.

# The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing  
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

## Power to Prevent Removal of Surface Support in Mining Operations

The right of mine operators to cause subsidence of soil in their operations was considered by the United States Supreme Court in a case decided December 11, 1922. The majority opinion written by Justice Holmes and the dissenting opinion written by Justice Brandeis, debate the question whether the police power is broad enough to authorize a state to prevent development of mining property in the interest of maintaining surface support and without compensating the mine owners for their resulting financial loss. The Court holds against the existence of such power.

The Pennsylvania Legislature enacted a law forbidding conduct of mining in such way as to remove the surface support, excepting where ownership of the surface and ownership of the mining rights are identical, or where the surface owners consent. The validity of the law was successfully attacked in the case of *Pennsylvania Coal Co. vs. Mahon*, on the ground that it involved an unconstitutional attempt to deprive mine owners of their property rights without compensation.

It is specifically decided that if a city like Scranton, Pa., sees fit merely to acquire street rights from surface owners, it cannot complain of the subsidence of a street as a result of mining below. On this point, the opinion of the Court says:

"The rights of the public in a street purchased or laid out by eminent domain are those that it has paid for. If in any case its representatives have been so short-sighted as to acquire only surface rights without the right of support we see no more authority for supplying the latter without just compensation than there was for taking the right of way in the first place and refusing to pay for it because the public wanted it very much."

Taking a contrary view, Justice Brandeis's dissenting opinion argued for a holding that the police power was broad enough to sustain the law. He invoked the

well-established legal principle that no one is entitled to so use his property as to commit a public nuisance. Instancing analogous cases in which the principle has been recognized by the Supreme Court, Justice Brandeis refers to decisions which have upheld the public right to restrict the location of brickyards, oil tanks and factories and otherwise to limit the use of private property without compensating the owner for his pecuniary loss.

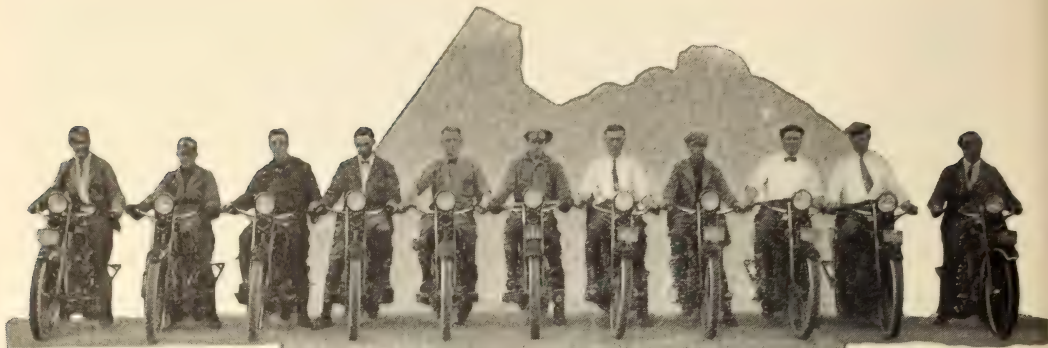
Until and unless the Supreme Court recedes from the view announced by its majority members, it follows that cities must either run the risk of surface subsidence resulting from the exercise of a subterranean owner's property rights, or buy off those rights.

## Municipal Liability for Creating Nuisance in Constructing Public Works

In a suit involving the liability of defendant city for so constructing a sewer system as to cause flooding of plaintiff's premises, the Georgia Court of Appeals announced a decision of which the following is an abstract:

While the maintenance by a city of a sewerage drainage system is connected with the preservation of the public health, and therefore is a governmental function, and while ordinarily the city cannot be held liable for any damage to person or property caused by the negligence of any of the city's servants while engaged in such work, and while a city ordinarily cannot be held liable for damage to person or property caused by an error of judgment on the part of its authorities in adopting a general plan of drainage and in determining when, where, and of what size, and at what level, drains or sewers shall be located, yet, where such negligence or error of judgment results in the creation and maintenance by the city of a nuisance, permanent in its character, and dangerous to life and health, and where





## Patrolling Every Highway in the State of Maine

EQUIPPING 14 members of the Maine State Highway Department with Harley-Davidsons proves again the great value of the motorcycle for public service.

States, counties, cities, towns — over 1,100 of them in all—are using Harley-Davidsons to fight crime, for patrol work and enforcing speed laws, and for a variety of service duties.

At a cost of only a few cents a day for maintenance, an officer's efficiency is increased many times when he is mounted on the swift, dependable, economical Harley-Davidson. What other mount costs so little to run? (Harley-Davidsons average two cents a mile—"gas," oil, tires and all.)

**HARLEY-DAVIDSON MOTOR CO.**

Milwaukee

Wisconsin

Ask your dealer for the *reduced prices* on 1923 models. Ten improvements, too. Or, write us for special Police Motorcycle literature. No obligation to you.

# Harley-Davidson The Motorcycle

the effect of the nuisance is specially injurious to an individual by reason of its proximity to his home, he is entitled to recover adequate compensation for his injuries, including damages for any decrease in the market value of his realty. (*Lewis vs. City of Moultrie*, 110 *Southeastern Reporter*, 625.)

#### **Apportioning the Expense of Interurban Improvements**

An opinion of Massachusetts Supreme Judicial Court (127 *Northeastern Reporter*, 635) deals with the validity of laws under which a state directs that the cost of an improvement be apportioned among different political subdivisions of the state. The Court was called on to determine the validity of a bill providing for apportionment of the expense of a bridge over the Connecticut River, 31 per cent against the county of Hampden, 55 per cent against the city of Springfield, 13 per cent against the town of West Springfield, and 1 per cent against the town of Agawam. Upholding the validity of the measure, the Court said:

"It is not essential that the burdens of taxation should be imposed upon cities and towns in proportion to the benefits received by each from the expenditure of the money raised, although this rule often has been prescribed and followed. Assessments of the cost and maintenance of bridges and other public improvements have been laid with regard to other considerations. Such expenses have been apportioned not only 'with reference to all circumstances of benefit to the respective municipalities affected,' but also with reference 'to their population, extent, and ability to bear the burden,' *Commonwealth v. Newburyport*, 103 *Mass.* 129, 134; *Boston, Petitioner, supra*. The expenses of the Metropolitan sewer system and of the Metropolitan park system have been apportioned according to the valuation of the several municipalities and according to percentages derived from combinations of valuation and population and upon other bases. In *re Metropolitan Park Commission*, 209 *Mass.* 381, and cases there collected. Even in the apportionment of special assessments upon privately owned land for the expenses of local improvements which must be proportional and ordinarily not in substantial excess of the benefits, *White v. Gove*, 183 *Mass.* 333, 67 *N. E.* 359, numerous and different methods have been upheld, as for example, assessments according to frontage to area, to valuation either with or without buildings, or to a combination of one or more of these with others have been upheld."

#### **A Legislature May Authorize a City to Acquire Property in Another State**

Holding that a city in Washington validly may acquire property in an adjoining state for water-works purposes when so authorized by the Washington Legislature, subject to the laws of the adjoining state, the Washington Supreme Court said in the case of *Langdon vs. City of Walla Walla*, 193 *Pacific Reporter*, 1:

"The question that, to allow a city of this state to acquire property of the nature here in question in another state would, in effect, be an assumption of extraterritorial jurisdiction, we think is wholly without force, in view of the fact that the city's ownership of such property situated outside its own territorial limits, whether within or without this state, is only the ownership and control over such property in the city's proprietary capacity. Such an ownership does not, to our minds, suggest an assumption of extraterritorial governmental jurisdiction, either on the part of the state of Washington or of its cities, over property, situated in another state. If the laws of Oregon permit the city of Walla Walla to acquire and own within that state property of the nature and for the use here in question—which as we think, will presently appear, though that is apart from this particular inquiry—manifestly we must presume that the courts of Oregon will protect the property rights the city so permissively acquires in that state, the same as they will protect the property rights of any other similar ownership of property therein, and that, should such protection be refused by the Oregon courts, the courts of the United States will afford such protection.

"The state of Oregon may, of course, if it so choose, withhold from the cities of this state the right to acquire property in that state, just as it may withhold such right from any other foreign corporation, but that does not argue that this state has not given to its cities such power of acquisition and ownership of property as will enable them to acquire property in Oregon by consent of that state."

#### **Limitations on Municipal Power to Annex Territory**

In a proceeding to annex territory to a village, the property annexed must be so conditioned as properly to be subjected to village government. Whether it is so conditioned is primarily for the voters; but if their action is clearly arbitrary, for the purpose of increasing sources of revenue rather than of subjecting to the local village government property having a natural connection with it and people residing thereon having a community of interest, the courts will not sustain it. (*Minnesota Supreme Court, State vs. Village of Buhl*, 184 *Northwestern Reporter*, 850.)



# Servicised Expansion Joints



## MONITORS OF THE ROAD

Old principles of expansion joint provide fillers of solid asphaltic content or impregnated fibre and asphalt in an elastic mass. ¶ The fundamental purpose of the filler is to re-occupy the space left by two contracting slabs. ¶ Solid asphaltic or impregnated fibrous materials contract, concrete slabs likewise contract on cooling. ¶ Three contracting bodies cannot occupy the same space as when expanded. Servicised Joints *expand* when the concrete slabs contract. ¶ This is the key to a permanent waterproof joint; a correct answer to the problem of expansion between two contracting bodies. Unimpregnated cellular fibrous matter in Servicised Joints brings about this re-expansion after compression is relieved.

**Trapped Under Compression:** The print to the right is an example of oozing under compression. Due to the hard asphalt surfacing over the concrete base, the traffic could not carry the surplus away because it was locked in between the asphalt surfacing and base. The force was great enough, however, to form bulges in the hard asphalt surface.

*Write Us About Your  
Expansion Joint  
Problems*



**A Bituminous and Impregnated Fibre or Elastic Mass:** No better proof of indiscriminate oozing. No better illustration of the need of expansion joint of the proper kind. The action in this instance resembles that of paste in a tube being squeezed with one side open. Action of this kind causes tremendous waste, without resulting in good. Servicised Joints will prevent this.

**Servicised Products Co.**  
First National Bank Bldg  
CHICAGO



TYPE B  
75% Bitumen  
25% Cellular Fibre



TYPE D  
Self-Expanding  
Non-Raising



TYPE C  
Felt Center-Coated  
Sides-Sidewalk Joint



TYPE AA  
3/16 Veneer Core

Four Types of Servicised Expansion Joints



in Which the Oozing Tendency Is Controlled

## Servicise the Crevice and Save the Road



## Non-Toll Bridge Being Built in Cooper County, Missouri

Principal Obstacles in the Way of Travel over National Old Trails Road Through Missouri Being Overcome

ONE of the principal obstacles to cross-country travel in Cooper and Howard Counties, Missouri, has been the necessity of crossing on ferries or toll bridges over the Missouri River. This is now being overcome through the construction of a steel span bridge which is being built at Boonville by Cooper County, Mo., and the Old Trails Bridge Company with Federal Aid. The bridge is now under construction and will consist of six steel spans with concrete road surfaces on five piers in the stream, each carried to solid rock. This bridge will be used by the State Highway Commission of Missouri for one or more of the primary roads which it is building at a cost of not less than \$29,000 per mile.

It is interesting that Boonville, at which point the bridge is being built, is practically the center of population of the state of Missouri and that an air line from St. Louis to Kansas City practically passes through Boonville, as do one from Macon, Mo., to Springfield, one from Hannibal to Nevada, and one from St. Joseph, Mo., to Jefferson City. The report of the engineer of the State Highway Department stated that the only economical and practical location for the St. Louis-to-Kansas City route is the straightest possible location along the center line of population, passing through or near St. Charles, Danville, Fulton, Columbia, Boonville, Sweet Springs and Kan-

sas City, with primary connections with Mexico, Jefferson City, Moberly, Sedalia, Marshall, Warrensburg and Higginsville. This location of the road is 15 miles shorter than any other that can be obtained, and the road serves more population than any other route that could be selected.

The structure built by the Old Trails Bridge Company and the county, includes the Boonville approach to the main river bridge and the Howard County approach. The Boonville approach consists of all work south of Pier No. 1 and includes a reinforced concrete trestle with one steel girder span, together with an abutment and embankment between concrete retaining walls. The main river bridge contains three through riveted truss spans each 419 feet long, three through riveted truss spans each 280 feet long, and seven piers supporting the spans. Six of these piers rest on bedrock, five of them being sunk by the pneumatic process and the sixth in an open cofferdam. The remaining pier is supported upon piles. All the piers are of concrete. The Howard County approach comprises an earth embankment with guard-fences. The bridge and approaches provide for highway traffic on a 20-foot roadway. The roadway is an asphaltic pavement on a concrete floor on the river spans and on the Boonville approach, and a mac-





Through these ample crankcase doors, all the main and connecting rod bearings may be adjusted or replaced. The entire piston assembly may be removed for wrist pin adjustment or piston ring replacement.

This indicates the general accessibility that prevails throughout BEST Tractors.

CHARLES A. CLARK, Chairman of the Board of Commissioners of Duval County, Florida, in a recent letter to the Jacksonville (Florida) dealer for BEST Tracklayer Tractors, states:

"The most important feature that every tractor should possess in order to be fair to both its Purchaser and Operator, is *accessibility* and simplicity of construction. I consider this to be one of the leading features of your 'BEST Tractor.' I have had the opportunity of inspecting quite a few of other makes of tractors, and feel that the 'BEST' is far ahead of anything now on the market."

Because working parts in BEST Tracklayer Tractors are *readily accessible*, necessary adjustments and minor repairs can be made right on the job without serious loss of time and at minimum expense, often effecting important savings.

City and County officials interested in economical power for public work are invited to write for facts and figures on the operation of BEST Tracklayer Tractors.

BEST Tractors are available in two sizes—the Sixty and the Thirty.

C. L. BEST TRACTOR CO.  
SAN LEANDRO, CALIFORNIA

Distributing Warehouses

St. Louis, Mo.  
818 North Second St.

Portland, Ore.  
East Salmon & Water Sts.

223-13

# BEST TRACTORS

The cost of the bridge, with all the improvements which have been considered advisable to enable the bridge to pass into Federal control, is as follows:

Present contracted price of bridge.....	\$386,141.05
Replacing trestle span 6 with steel span and adding pier 7.....	21,417.65
Crossotting floor planks and curbs.....	8,400.00
Metal pipe hand-rail to replace wood hand-rail .....	8,964.00
Addition for concrete floor paved with asphalt .....	2,500.00
Carrying pier 5 down to rock by pneumatic process .....	25,085.50
Field supervision and contingencies....	44,380.52
	<hr/> \$496,888.72

approach, the cost of which has been cared for by a \$50,000 bond issue by the city of Boonville, carried by a vote of 1,292 for, and 88 against. The total expense for the bridge is taken care of as follows:

Original bridge subscribers will donate....	\$100,000
Cooper County has voted bonds for.....	125,000
Franklin Township in Howard County has voted bonds for .....	25,000
State and Federal Aid already promised..	250,000
<b>Total .....</b>	<b>\$500,000</b>

The vote of Cooper County for the \$125,000 bond issue gave a majority of three to one in favor of the issue, and on July 21 Franklin Township in Howard County almost unanimously voted its \$25,000 bond issue.

## A Well-planned Fire Apparatus Inspection Blank

# CITY OF LAKEWOOD

DIVISION OF FIRE

Eng. Co. No. Monthly Inspection Report Make  
H. & L. Co. No. of Model  
Misc. Apparatus Mfg. No.

19

Herewith please find Report of Condition of Apparatus in Service at this Company for Month Ending . . . . . 19 . . . . .

A Separate Form must be used for each separate car that comes into Quarters.

1. Is radiator full? . . . . .
2. Is anti-freeze required? . . . . .
3. Is fan belt tight? . . . . .
4. Is water hose in good condition? . . . . .
5. Are all water joints tight? . . . . .
6. Does radiator leak? . . . . . How badly? . . . . .
7. Are crankcase to frame bolts tight? . . . . .
8. Does carburetor flood or drip? . . . . .
9. Is motor properly timed? . . . . .
10. Are gasoline screens cleaned? . . . . .
11. Does gasoline tank hold pressure? . . . . .
12. Does vacuum tank work properly? . . . . .
13. Does carburetor choke properly? . . . . .
14. Is compression good? . . . . .
15. Are valves properly adjusted? . . . . .
16. Should valves be reground? . . . . .
17. Has motor normal power? . . . . .
18. Do rods or main bearings need taking up? . . . . .
19. Is oil in crankcase up to level? . . . . .
20. Should oil be changed? . . . . .
21. Give date of last change of oil? . . . . .
22. What is oil pressure, motor idling? . . . . .
23. Is oil strainer clean? . . . . .
24. Have transmission and rear axles sufficient oil? . . . . .
25. Date last change . . . . .
26. Are magneto breaker points clean? . . . . .
27. Are magneto points properly adjusted? . . . . .
28. Is magneto distributor clean? . . . . .
29. Are spark plug gaps adjusted at .025? . . . . .
30. Does clutch pedal strike floor board? . . . . .
31. Does clutch brake work properly? . . . . .
32. Is clutch action smooth? . . . . .
33. Does shifting lever work properly? . . . . .
34. Does emergency brake work properly? . . . . .
35. Do foot brakes work properly? . . . . .
36. Do brakes need relining? . . . . .
37. What is the condition of universal joints? . . . . .
38. Are universal joints properly doped? . . . . .
39. Are brake shafts and connections lubricated? . . . . .
40. State condition of tires . . . . .
41. State condition of wheels . . . . .
42. State condition of body . . . . .
43. State condition of drive chains . . . . .
44. State condition of paint . . . . .
45. State condition of apparatus in regard to cleanliness . . . . .
46. Is steering gear working properly? . . . . .
47. Are wheel bearings properly adjusted? . . . . .
48. Do radius rods need adjusting? . . . . .
49. Is torque arm tight? . . . . .
50. Does starter work properly? . . . . .
51. Has battery sufficient water? . . . . .
52. Are battery connections clean? . . . . .
53. Does switch work properly? . . . . .
54. State condition of lighting system . . . . .
55. State condition of ignition system . . . . .
56. State condition of fire pumps . . . . .
57. State condition of suction . . . . .
58. State condition of gaskets . . . . .
59. State condition of gauges . . . . .
60. State condition of vacuum pump . . . . .
61. State condition of hose gauges . . . . .
62. Does pump hold vacuum? . . . . .
63. How much vacuum does pump pull? . . . . .
64. Are drivers capable? . . . . .

No. of alarms responded to . . . . . Miles traveled . . . . . Actual pumping service: Hours . . . . . Min . . . . .

Amount of gasoline and lubricating oil used since last report: Gas, gallons . . . . . Lub. oil, quarts . . . . .

Delays where apparatus was at fault: No. of . . . . . Time of delays . . . . .

Cause . . . . .

Apparatus out of service . . . . . Cause . . . . .

Explain under head of Remarks any condition needing attention.

Remarks . . . . .

Remarks . . . . .

Remarks . . . . .

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Remarks . . . . .

Remarks . . . . .

Remarks . . . . .

Remarks . . . . .

Signed { Driver or Engineer . . . . .  
Commanding Officer . . . . .

THE number of cities almost entirely equipped with motor fire apparatus has increased tremendously in the last decade. Inasmuch as great dependence is placed on motor apparatus, which may not show its ills or weaknesses as quickly as the old fire horse, it is absolutely essential that some means of checking the care of the apparatus be devised.

In Lakewood, Ohio, the accompanying inspection blank has been devised and has to be turned in each month to the Fire Chief. On this report every part of the motor has a place for entry, which shows the exact condition of the machine and leaves room for any explanation and remarks. It would be well for many other cities to require such detailed reports in order to guard against any possible breakdowns of fire apparatus.



# number 500

Each knot of the genuine African Bass fibre is deeply and firmly set in a clear, white elm block. The wide flare digs in close against the walls and curbs. The brush will not shed.

Those are the reasons why Osborn No. 500, by continued re-orders year after year from more than 500 cities, has proved itself unquestionably the most popular municipal push broom in the United States.

No. 500 is only one of many brushes and brooms for city use carried in stock for immediate delivery.

*Write for Prices*

**THE OSBORN MFG. CO.**  
INCORPORATED

New York CLEVELAND Detroit  
Chicago San Francisco



# Excess of Families Over Dwellings

“DWELLINGS and Families” is the title of a special bulletin of the Bureau of the Census, embodying a summarization of the data on this subject which were collected for the 1920 Census.

A dwelling, for census purposes, is a place in which one or more persons regularly sleep. It need not be a house in the usual sense of the word, but may be a hotel, boarding-house, institution, or the like. A boat, a tent, a freight car, or a room in a factory, store, or office building, although occupied by only one person, is also counted as a dwelling, while, on the other hand, an entire apartment house, although containing many families, constitutes but one dwelling.

For the United States as a whole, a decrease in the average number of *persons* per dwelling has been shown at each census from 1850 to 1920 for which comparative figures are available. During the same period, however, as a result of the increased construction of apartment houses and tenements, the number of *families* per dwelling has increased from 1.07 to 1.18.

The excess of families over dwellings in the United States in 1920 was equal to 15 per cent of the total number of families. This, of course, does not mean that only 15 per cent of the total number of families were living on January 1, 1920, in plural-family dwellings. To illustrate: Suppose that 120 families were housed in 100 dwellings and that no more than two families occupied one dwelling. In this case 80 fami-

lies would occupy 80 dwellings and 40 families would occupy 20 dwellings, and the number of families living in dwellings housing more than one family each would be 40, or exactly twice the excess of families over dwellings. If, however, 98 families occupied 98 dwellings and each of the remaining 2 dwellings was occupied by 11 families, the number of families living in plural-family dwellings (22) would be only slightly greater than the excess of families over dwellings (20). The number of families living in plural-family dwellings is, therefore, somewhat more than the excess of families over dwellings.

The percentage of excess of families over dwellings in each city of 100,000 inhabitants or more is shown in the accompanying table. The average excess for these cities is 37.5 per cent of their total number of families.

The term “family,” as used in the census, signifies a group of persons, whether related by blood or not, who live together as one household, usually sharing the same table. One person living alone is counted as a family, and, on the other hand, all the occupants and employees of a hotel, boarding-house, or lodging-house, if that is their usual place of abode, and all inmates of an institution, however numerous, are treated as constituting a single family.

The number of persons to a family, like the number to a dwelling, has decreased from census to census since 1850, having been 5.6 in 1850 and 4.3 in 1920.

## PERCENTAGE OF EXCESS OF NUMBER OF FAMILIES OVER NUMBER OF DWELLINGS

From the Federal Census of 1920

City	Per Cent Excess	City	Per Cent Excess	City	Per Cent Excess	City	Per Cent Excess
Akron .....	27.5	Fall River .....	47.7	New York .....	71.4	St. Louis .....	38.9
Albany .....	34.5	Fort Worth .....	21.4	Bronx Bor. ....	79.6	St. Paul .....	22.0
Atlanta .....	23.1	Grand Rapids .....	13.5	Brooklyn Bor. ....	61.7	Salt Lake City .....	16.1
Baltimore .....	18.3	Hartford .....	46.5	Manhattan Bor. ....	85.6	San Antonio .....	16.9
Birmingham .....	18.4	Houston .....	16.1	Queens Bor. ....	41.3	San Francisco .....	26.9
Boston .....	51.7	Indianapolis .....	11.8	Richmond Bor. ....	23.2	Scranton .....	19.5
Bridgeport .....	30.2	Jersey City .....	53.7	Newark .....	55.5	Seattle .....	24.4
Buffalo .....	36.4	Kansas City, Kans. ....	9.5	Norfolk .....	25.4	Spokane .....	17.6
Cambridge .....	40.2	Kansas City, Mo. ....	25.3	Oakland .....	15.2	Springfield .....	37.6
Camden .....	6.5	Los Angeles .....	21.6	Omaha .....	14.6	Syracuse .....	30.9
Chicago .....	46.2	Louisville .....	21.6	Paterson .....	41.7	Toledo .....	14.6
Cincinnati .....	40.8	Lowell .....	30.1	Philadelphia .....	12.4	Trenton .....	11.6
Cleveland .....	36.2	Memphis .....	16.7	Pittsburgh .....	27.9	Washington .....	25.0
Columbus .....	12.3	Milwaukee .....	36.9	Portland .....	18.5	Wilmington .....	14.8
Dallas .....	16.0	Minneapolis .....	28.6	Providence .....	34.9	Worcester .....	50.7
Dayton .....	11.1	Nashville .....	17.3	Reading .....	9.7	Yonkers .....	53.4
Denver .....	18.2	New Bedford .....	44.3	Richmond .....	21.5	Youngstown .....	16.3
Des Moines .....	14.3	New Haven .....	37.8	Rochester .....	17.2		
Detroit .....	30.0	New Orleans .....	9.6				





Bancroft School, Worcester, Mass.

**E**XCELSIOR Chain Link Fence meets the exacting necessities for the school-house enclosure.

Because it is unclimbable it offers no temptation and accompanying accidents for the rising youth. Because it is galvanized *after* weaving it has rust proof qualities impossible in any other kind of steel fence. Its even, sturdy mesh construction harmonizes with the ideals of modern schoolhouse designs.

We shall be glad to submit estimates on fencing and gates in either chain link or our patent clamp construction, either in the fabric or erected.

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**San Francisco**

# *It will interest you to know that —*

## **Municipal Salaries Have Been Adjusted to Living Costs in St. Paul**

St. Paul has put into effect a plan by which the salaries of its municipal employees are automatically adjustable to the rise and fall in the cost of living. Seventeen distinctive grades of service are established, excluding certain skilled and common labor employments, and positions are allocated to these various grades in accordance with the economic value of the services to the city, taking into consideration the importance, difficulty, and responsibility of the duties performed, the qualifications required, and so on.

In adjusting salaries to the cost of living, the year 1916 is used as a base. A scale of increases over the basic rate is fixed in the ordinance to apply to salaries of the various grades until July 1, 1923. Beginning next July and annually thereafter, the salary rates are to be adjusted in accordance with the changes in cost of living as shown by the index numbers prepared and published by the United States Bureau of Labor Statistics.

Pamphlets entitled "Rates of Compensation for City Positions" and "Civil Service Rules and Classification" will be sent to any reader of *THE AMERICAN CITY* on application to J. B. Probst, Chief Examiner, Civil Service Bureau, St. Paul, Minn.

## **Fifteen Million People Live in Zoned Cities**

More than 15,000,000 people—27 per cent of the population of the United States—live in zoned cities, towns and villages, according to information made public by the Federal Department of Commerce. Up to the first of this year, 109 cities, towns and villages had been zoned, as compared with 55 at the beginning of 1922.

The Department's investigation shows that in 1922 zoning spread especially rapidly in smaller places. Fourteen towns with five to ten thousand inhabitants were zoned during the year, bringing the total zoned towns in this class to twenty-three. Twelve places with 5,000 inhabitants or less were added to the list in 1922, bringing the total in that class to 17. The percentage of large cities which have already zoned remains much

greater, of course, and of the fifty largest cities in the country, twenty-two have zoning ordinances in effect.

The complete list of zoned municipalities, as of January 1, 1923, with reference to the state acts under which zoning is permitted, may be obtained from the Division of Building and Housing of the Department of Commerce, which also has available for distribution such pamphlets as "A Zoning Primer," explaining in popular style the elements of zoning, and "A Standard State Zoning Enabling Act," a model act for the assistance of states in preparing laws permitting city zoning.

## **The Average American Might Live Ten Years Longer**

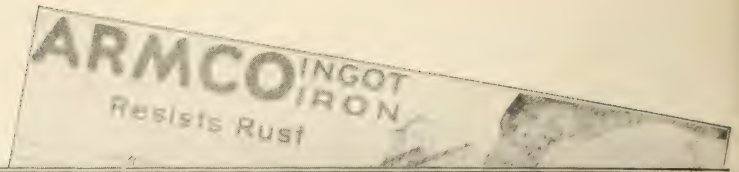
We are still far from having attained the limit of the life-span under the conditions of our present knowledge of preventive medicine and sanitary science. At least ten years could be added to the prevailing expectation of life for the average person in the United States, if the death rates already attained in certain countries, and in certain parts of our country, were to apply generally to our whole population. This was the principal conclusion drawn by Doctor Dublin, Statistician of the Metropolitan Life Insurance Company, in an address delivered before the Harvey Society at the New York Academy of Medicine.

From the observed experience of many localities in recent years, the most favorable of the attained death rates were abstracted and a life table calculated along the following lines:

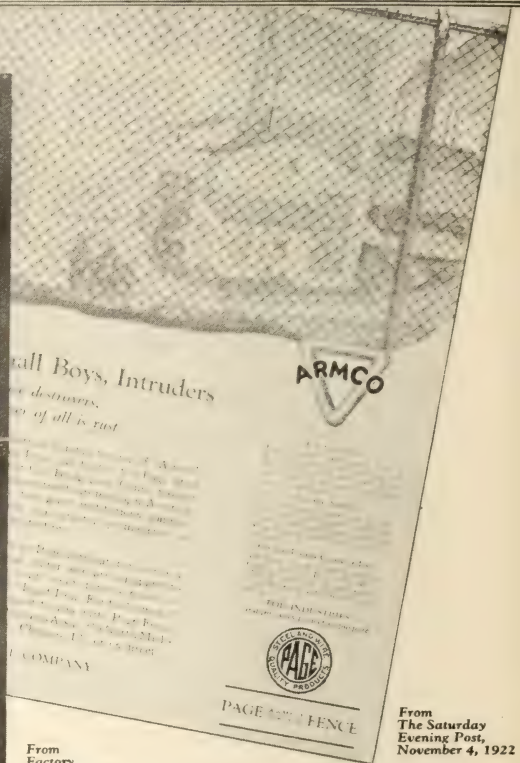
*Hypothetical Life Table, Based Upon Mortality Rates Attainable Under Present Knowledge of Preventive Medicine and Public Health*

AGE	Number Living in Specified Age Interval	Mortality Rate Per 1,000	Expectation of Life
0.....	100,000	38.21	64.75
1.....	96,179	10.00	66.30
2.....	95,218	4.20	65.97
3.....	94,818	2.80	65.24
4.....	94,552	2.25	64.42
5.....	94,339	1.85	63.57
6.....	94,339	1.14	59.02
10.....	93,648	2.34	49.82
20.....	92,269	3.26	41.06
30.....	89,772	4.70	32.49
40.....	86,318	7.19	24.08
50.....	81,542	14.29	16.01
60.....	73,882	56.45	9.17
70.....	56,213	130.28	5.29
80.....	22,818	249.62	3.03
90.....	3,110	401.91	1.85
100.....	67		





# PAGE PROTECTION FENCE - the only fence of ARMCO INGOT IRON



**H**OW long your fence lasts depends upon whether it is merely a fence or a Page-Protection Fence made of rust-resisting "Armco" Ingot Iron. "Armco" Ingot Iron is commercially pure iron. It not only resists rust, but its smooth, even surface makes a close bond with the galvanizing, which will not crack or peel.

There is only one manufacturer authorized to make fencing of "Armco" Ingot Iron, and that is the

Page Steel & Wire Co., Bridgeport, Conn., pioneer manufacturer of wire fencing in America. Thus, two great institutions combine to give you greater permanence in fence protection.

There are Page erecting organizations near every industrial center, equipped to supply and erect fences of steel or "Armco" Ingot Iron.

For the name of the erecting organization nearest to you, and complete literature, write

PAGE FENCE & WIRE PRODUCTS ASSN.  
215 North Michigan Ave., Chicago, Ill.

## The Present City of New York Is Twenty-Five Years Old

Greater New York had its twenty-fifth birthday on January 1, 1923, the city as now constituted having come into being on January 1, 1898. Before that day the name of New York had been borne by the Island of Manhattan and part of The Bronx. The union of these with the city of Brooklyn, Queens County, Staten Island and a part of Westchester County brought together in the greater city a population of somewhat over 3,000,000. Now there are nearly 6,000,000 in the same area. During the 25 years the tax budget has grown from \$77,473,000 in 1898 to \$353,350,976 in 1922; and the assessed valuation from \$1,856,567,923 to \$10,249,995,630.

## Denver Has Announced Its First List of Civic Benefactors

The Municipal Commission on Civic Benefactors of the city of Denver has announced a list of thirty citizens, some living, some dead, who by gifts of a national character have added to the beauty or distinction of the city. Their names will be inscribed upon the colonnade in the south end of the civic center. The Commission was appointed two years ago by Mayor Dewey C. Bailey, in carrying out the wish of the late Mayor Robert W. Speer, with whom the idea of honoring civic benefactors originated. Additional names will be given

recognition probably once a year by the Commission, whose work will never be completed while Denver lasts. The gifts to the city include paintings and sculpture, natural history groups and collections, gateways, fountains, parks, a college for orphans, an addition to the Colorado Natural History Museum, a stalactite cave, and special memorials.

## The Home Ownership Percentage in the United States Is Decreasing

Out of over twenty-four million homes in the United States more than 54 per cent are rented homes, according to figures furnished the National Association of Real Estate Boards by the Federal Census Bureau. During the ten years from 1910 to 1920, the proportion of rented homes was on the increase, and, of the homes that were owned, a larger per cent were owned free and a smaller per cent were encumbered in 1910 than in 1920.

While the variation is not alarmingly large, it represents a tendency which has been manifesting itself slowly but surely for the past thirty years. The following table tells the story in brief:

YEAR CENSUS	Homes Rented	Free Homes	Encumbered Owned
1920.....	13,236,709	6,862,520	4,252,447
1910.....	10,982,380	6,236,074	3,037,101
1900.....	8,719,060	5,127,935	2,340,720
1890.....	6,623,735	4,369,527	1,696,890

## On the Calendar of Conventions

FEBRUARY 14-15.—INDIANAPOLIS, IND.

*Indiana Sanitary and Water Supply Association. Annual meeting.* Secretary, C. K. Calvert, 1902 North New Jersey Street, Indianapolis, Ind.

FEBRUARY 14-17.—TRENTON, N. J.

*New Jersey State Highway Association. Annual convention.* Secretary, Edward O'Brien, State Highway Department, Trenton, N. J.

FEBRUARY 14-16.—LAFAYETTE, IND.

*Indiana State City Planning Conference.* Address: Director of Engineering Extension, Purdue University, Lafayette, Ind.

FEBRUARY 16-17.—UTICA, N. Y.

*Conference of Commercial Organization Secretaries of the State of New York. Annual conference.* Address: John G. Duffy, Secretary, Chamber of Commerce, Utica, N. Y.

FEBRUARY 19-20.—CLEVELAND, OHIO.

*National Highway Traffic Association. Annual convention.* Secretary, Elmer Thompson, 247 West 54th Street, New York, N. Y.

FEBRUARY 19-20.—CLARKSBURG, W. VA.

*West Virginia Association of Commercial Organization Secretaries. Annual convention.* Secretary-Treasurer, William Kennedy, Parkersburg, W. Va.

FEBRUARY 25-MARCH 1.—CLEVELAND, OHIO.

*National Education Association, Department of*

*Superintendence. Annual meeting.* Secretary, Dr. S. D. Shankland, Andrews Institute for Girls, Wiloughby, Ohio.

FEBRUARY 28-MARCH 2.—TORONTO, ONT.

*Ontario Good Roads Association. Annual convention.* Secretary, George S. Henry, R. R. 1, Todmorden, Ont.

MARCH 12-14.—EVANSVILLE, IND.

*Indiana Society of Sanitary Engineers. Annual convention.* Secretary, Emil Hartig, 1026 West Franklin Street, Evansville, Ind.

MAY 7-9.—NORFOLK, VA.

*American Association of Engineers. Annual convention.* Secretary, C. E. Drayer, 63 East Adams Street, Chicago, Ill.

MAY 21-25.—DETROIT, MICH.

*American Water Works Association. Annual convention.* Secretary, J. M. Diven, 153 West 71st Street, New York, N. Y.

JUNE 4-8.—NEW YORK, N. Y.

*National Electric Light Association. Annual convention.* Executive Manager, M. H. Aylesworth, 29 West 39th Street, New York, N. Y.

NOVEMBER 12-16.—MEMPHIS, TENN.

*American Society for Municipal Improvements. Annual convention.* Secretary, Charles Carroll Brown, P. O. Box 234, St. Petersburg, Fla.



# Make Your Lawns the Pride of Your City

You can do it and save money. The "4-Acre" Power Lawn Mower does the work of four or five men with hand mowers, cutting four to five acres a day at a fuel cost of less than 40c a day. Adopted by leading park superintendents as standard equipment. Unsurpassed for use in small parks, boulevards, and places inaccessible to gang mowers.

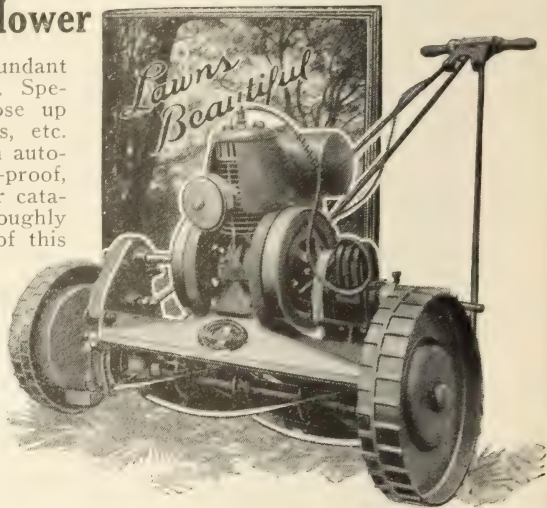
## A "4-Acre" Power Lawn Mower

quickly pays for itself in labor saved. Abundant power for hilly ground and tough spots. Specially designed to handle easily in close up work around trees, shrubs, flower beds, etc. Built with the mechanical accuracy of an automobile, yet sturdy as a tractor. Trouble-proof, strong and simple to operate. Write for catalogue, "Lawns Beautiful," which thoroughly describes superior mechanical features of this wonderful mower. Also ask for special literature on our Power Putting Green Mower for your municipal golf course.

*Write for Free Beautiful Book Today.*

**Jacobsen Manufacturing Co.**

Dept. E., Racine, Wis., U. S. A.



HOW many cutting units have been wrecked in mowing your fairways? Learn this from your grounds keeper and you will appreciate the value of Ideal "Bulldog" cutting units that sturdily endure month after month of rough, hard use. Made extra-heavy, of special steels and with Timken bearings they are free from breakage and retain their adjustments longer than any cutting units made. The strongest argument in favor of the Ideal Triplex Mower is the experience of others. "The fastest, most durable mower we have ever used" is the verdict of scores of noted clubs.

*Proof of its superiority will be sent on request.*

**Ideal Power Lawn Mower Company**

(22)

*R. E. Olds, Chairman*

400 Kalamazoo Street, Lansing, Michigan  
New York, 13-19 Hudson St.

Chicago, 11 East Harrison St.

*Dealers in all Principal Cities*

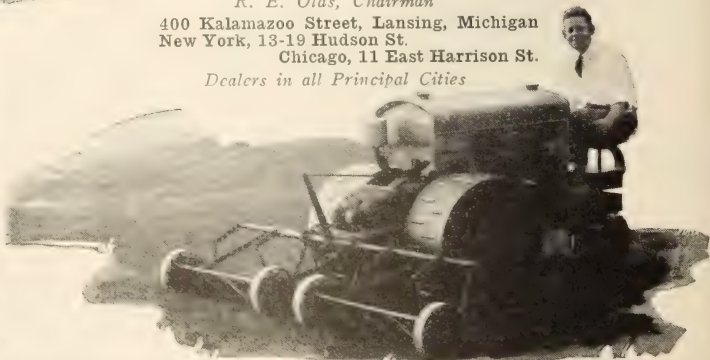


Turns in Own Length Forward Or Backward

Cutters can be raised or lowered by the operator without leaving his seat or stopping the mower.



Raising Cutters from Seat for Crossing Walks or Driveways



# Paragraphs Worth Quoting

## Long-Distance Thinking

The great lesson we can learn from European cities is the wisdom of thinking in terms of generations, rather than in terms of months and years, in the planning of a city. Almost every civic undertaking of consequence takes many years in accomplishment.—J. C. NICHOLS.

## The Fourth "R" for Public Schools

It has been suggested that a fourth "R" be added to the "R's" taught in public schools, namely, "Respect for the Law." Parents and city officials should give every assistance possible to teachers in teaching this subject, for, as a Kansas editor has said, the uninformed are several laps ahead of the misinformed on the road to civilization.—*Kansas Municipalities*.

## When Two Roads Cross

In the United States we are apt to think only of the planning of communities already in existence, and in practise we rarely attempt to guide their growth until they have already attained a considerable size. This is a grave mistake. For good or for ill, as soon as two roads of a given width cross at a given place and angle, and a building starts at the intersection, important features of the future community, its life and growth, have been carelessly, perhaps, but in all probability irrevocably fixed.—From "The Law of City Planning and Zoning," by FRANK BACKUS WILLIAMS.

## Revenue from Traffic Policeman

A traffic policeman probably costs nothing to the city in the collective sense; in fact, I imagine he will be found to be a source of revenue. He not only prevents accidents, saving to the community the economic value of those who would have been injured and killed, but he speeds up expensive traffic, greatly lessening the average time between receiving and delivery points, and thereby greatly lessening costs. That the saving is not visible, does not mean that it is not real. In this, there is not only a direct money value, but there is the increased efficiency with which the industrial and commercial activities of the city are conducted.—ARTHUR WILLIAMS.

## Relation of Land to Life

Land without population is a wilderness, and population without land is a mob. The United States has many social, political, and economic questions—some old, some new—to settle in the near future, but none so fundamental as the true relation of the land to the national life.—JAMES J. HILL.

## Elevating the Conception of Citizenship

If people learn to love their country, if their vision is raised beyond the petty circle of their personal and family interests to appreciate the true width and splendors of national life as a thing which not only embraces all of us who are now living here and grouped in a great body seeking common ends, but reaches back into the immemorial past and forward into the mysterious future, it elevates the conception of citizenship, it fills the sheath of empty words with a keen-edged sword, it helps men to rise above mere party views and to feel their exercise of voting power to be a solemn trust.—JAMES BRYCE.

## Education the Foundation of Democracy

George Washington said: "In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened."

John Jay, the first Chief Justice of the United States, said: "As the weak and the wicked are generally in alliance, as much care should be taken to diminish the number of the former as of the latter. Education is the way to do this."

James Madison said: "A popular government without popular information or the means of acquiring it, is but a prologue to a farce or a tragedy."

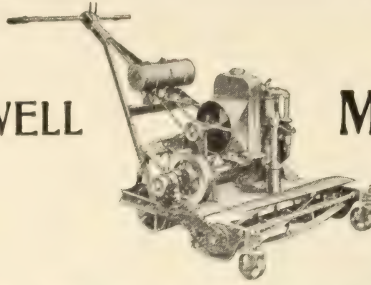
John Adams said: "Laws for the liberal education of youth, especially of the lower classes of people, are so extremely wise and useful, that . . . no expense for this purpose would be thought extravagant."

Abraham Lincoln said: "I hope I may live to see the day when an unfettered start and a fair chance in the race of life is guaranteed to every American boy and girl."



**COLDWELL**

**MOWERS**



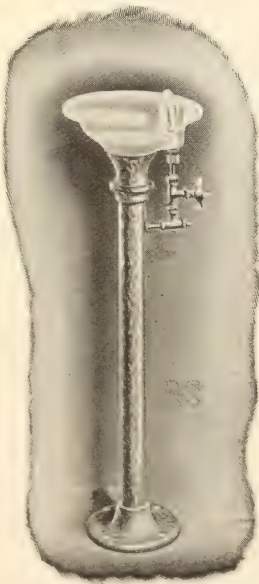
## Fine Cuts at Low Costs

The six acres per day capacity of the Coldwell Model "L" Motor Lawn Mower is a factor for economy that has proven extremely useful throughout parks the country over.

The Model "L" not only mows the lawn, but the gentle rolling action, taking place at the instance of cutting, leaves behind a 25-inch swath of healthy turf that will make your park a beauty spot.

The Model "L" is the most efficient powered mower you could buy, and our representative is willing to prove it with facts. Why not invite him over?

**COLDWELL LAWN MOWER CO.**  
NEWBURGH, N.Y. U.S.A.



## Vertico-Slant SANITARY DRINKING FOUNTAINS

The slight angle of the Vertico-Slant fountain obviates the necessity of a special valve for drawing water to fill a glass or cup. An individual drinking cup may be readily filled as from a faucet. Finger contamination is practically eliminated as the nozzle is located at the bottom of a recess, protected by a wall on three sides, which discourages the attempt to squirt.

**Lips cannot touch the nozzle.**

*Bubbling Fountain catalog free on request.*

**Rundle Spence Mfg. Co**  
MILWAUKEE, WIS.

# Municipal and Civic Publications

*Prices do not include postage unless so stated*

**The Law of City Planning and Zoning.**—By Frank Backus Williams, A.M., LL.B., of the New York Bar. The Macmillan Company, New York. 1922. In the Citizen's Library of Economics, Politics and Sociology, edited by Richard T. Ely, Professor of Economics in the University of Wisconsin. XVII + 738 pp. \$5.00.

The law relating to city planning matters is here presented comprehensively, logically, analytically, in such a way as to illuminate the whole procedure of attaining unity in the physical development of communities. As there can be no action toward this end without legislative authority, it is essential that every one who works along this line of progress should know the means by which city plans may be made, carried out, and paid for. The book is therefore of great value not only for reference by members of the bar to the relevant statutes and cases here collected, but also for the use of city officials, engineers, architects, builders, realtors, and other active citizens. It coordinates the principles and features of city planning with reference to the development of the city as a whole, to public streets, parks, and utilities, to private land and buildings, to the devising of methods of financing public construction, to the promotion of beauty, and to the administration of city planning law. The bibliography and the careful and exhaustive index with cross-references aid in making this an effective tool for planners and builders of cities.

**The Planning of the Modern City.**—A Review of the Principles Governing City Planning. By Nelson P. Lewis, former Chief Engineer of the Board of Estimate and Apportionment of New York City with the assistance of Harold M. Lewis. Second edition, revised. John Wiley & Sons, Inc., New York. XVII + 457 pp. Many views, diagrams and plans. \$5.00.

This new edition presents the standard principles of city planning theory and practise, and records as many as possible of the important city planning accomplishments up to the present time. The material on zoning has been expanded to adequately cover the development of this principle, and the chapter on "Progress and Methods" covers the present tendency to consider larger city planning units and to do regional planning. A few of the illustrations in the first edition have been replaced by better or more timely ones, and the index has been enlarged and improved.

**National Conference on City Planning.**—Proceedings of the Fourteenth National Conference on City Planning, Springfield, Mass., June 5-7, 1922. 214 pp. Illustrated. Apply to Flavel Shurtleff, Secretary of the Conference, 130 East 22nd Street, New York, N. Y. \$2.25.

Including the following papers: "Parks and Playgrounds," by Henry V. Hubbard; "The School Building Program an Important Part of the City Plan," by Dr. George D. Strayer; "The Treatment of the River Front," by Colonel Stanhope E. Blunt; "The Design of the Street System in Relation to Vehicular Traffic," by Ernest P. Goodrich; "The Fundamentals of Transit Planning for Cities," by Daniel L. Turner; "The Place of the Beautiful in the City Plan," by John Nolen; "The Value of Art Commissions in City Planning," by Andrew Wright Crawford; "Methods of Winning Public Support for a City Planning Program," by Dr. Samuel B. Woodward; "Better Homes with More Profit," by Lawson Purdy; "The Buffalo City Plan," by C. J. Hamlin. Containing also a list of cities that have shown an interest in city planning, by making city planning studies or appointing city planning or zoning boards.

**A Standard State Zoning Enabling Act Under Which Municipalities May Adopt Zoning Regulations.**—Revised edition, January, 1923. 16 mimeographed pp. (Apply to the Department of Commerce, Washington, D. C.)

**Motor Vehicle Transportation.**—By Henry C. Spurr, Editor of Public Utilities Reports. Public Utilities Reports, Inc., Rochester, N. Y. 1922. 696 pp. \$6.00.

A very much worth-while volume which has been prepared to bring together in convenient form the various rules, regulations, policies and practises affecting motor vehicle transportation in the United States. The rapid development of the automobile as a public transportation agency and its entrance as a competitor in the field of public service give rise to problems which interest all other transportation agencies and a large group of industries and individuals directly or collaterally affected, as well as the public in general. The book takes up the contemporary development of the existing theory of public supervision, and gives a classified review of general rules, regulations and legislation governing rates, operation and service in many states. It also gives state commission rulings and policies as expounded and applied in actual controversy. Municipal officials studying the problem of motor vehicle transportation and regulation will find much of value in this volume.

**Brown's Directory of American Gas Companies and Gas Engineering and Appliance Catalog for 1922.**—C. E. Reese, Editor, Robbins Publishing Company, Inc., New York. 1922. 966 tpp. \$10.00 to individuals; \$7.50 to gas companies.

A catalog of catalogs in the gas engineering industry, bringing into a single volume compactly and logically assembled and cross-indexed manufacturers' catalogs for the benefit of gas companies and officials. It contains a classified index of products, printed on tinted paper, lists the manufacturers of all articles mentioned, arranges the products in alphabetical order, and gives the names of firms that can supply each article. There is also an alphabetical index of all manufacturers whose products are listed.

**Depreciation of Public Utility Properties.**—By Henry Earle Riggs, A.B., C.E., Professor of Civil Engineering, University of Michigan. McGraw-Hill Book Company, Inc., New York. 1922. IX + 211 pp. \$2.00.

The relation of depreciation to fair value and changes in the level of prices. The book sets forth the author's views and conclusions gained in an experience of many years in work on both sides of the question and in various phases of controversy. An attempt to find the middle ground of fairness and justice. Various legal decisions dealing with the subject of depreciation are given in chronological order and at some length, showing the drift of legal opinion with which those engaged in valuation work should be familiar.

**Digest of City Manager Charters.**—By Robert T. Crane, LL.B., Ph.D., Director of the Bureau of Government, University of Michigan. National Municipal League, 261 Broadway, New York. \$5.00.

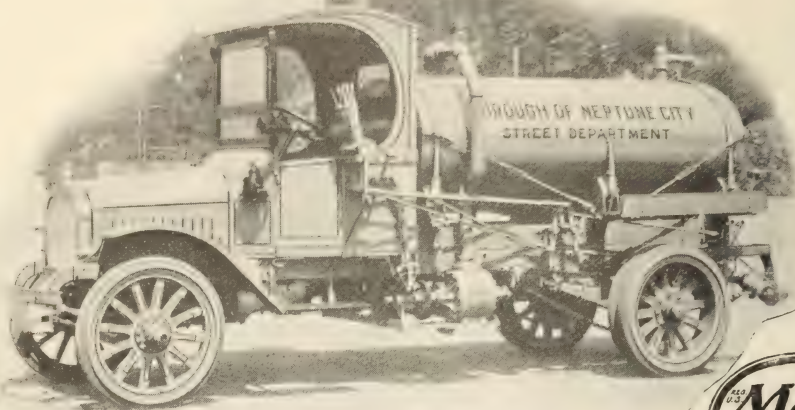
A loose-leaf collection of digests of 167 city manager charters now in operation in American cities. New digests can be added from time to time as additional cities adopt this form of government. For use by commissions and committees for drawing and revising charters, by libraries, by civic organizations, and all students of the city manager plan. A pamphlet copy of the Model City Charter is included.

**Plans and Illustrations of Prisons and Reformatories.**—Collected by Hastings H. Hart, LL.D., President of American Prison Association. Russell Sage Foundation, New York. 1922. Quarto. 62 pp. \$2.50.

Presented at the Fifty-second Congress of the American Prison Association, Detroit, October, 1922. Descriptive text accompanies the illustrations, making plain the objects which the various plans are designed to attain in establishing new prison conditions.

**The Social Trend.**—By Edward Alsworth Ross, Ph.D., LL.D., Professor of Sociology in the University of Wisconsin. The Century Co., New York. 1922. 235 pp. \$1.75.





# The Mack Gravity Sprinkler

**O**FFERS an efficient street-sprinkling apparatus at a lower cost than the pressure type.

The water passes from the bottom of the tank at the rear, through a 4" hose, finally discharging through the famous Studebaker sprinkler heads.

## *Offered in Two Types*

The vertical type discharges the streams downward and has shut-off shields to prevent wetting crosswalks and passing vehicles. The Niagara type throws the water upward whence it falls like rain to the ground.

A 1000-gallon tank will cover a swath about 25 feet wide, diminishing to about 16 feet when nearly empty with both nozzles wide open. Nearly a mile of road-way can be wet down with one filling of the tank.

The sprinkler unit is mounted on a standard AB Mack chassis. Description and specifications on request.

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INTERNATIONAL MOTOR COMPANY  
25 Broadway, New York City



## PERFORMANCE COUNTS

**Social Work.**—Proceedings of the National Conference of Social Work at the Forty-ninth Annual Session held in Providence, R. I., June 22-29, 1922. Published by The University of Chicago Press, Chicago, Ill. VI + 522 pp. \$3.00.

**The Settlement Horizon—A National Estimate.**—By Robert A. Woods and Albert J. Kennedy. Russell Sage Foundation, New York, 1922. VI + 499 pp. \$3.00.

A broad study of the history, the aims, the experience, and the influence of settlements, based on personal visits and conferences and on a large supply of private and published information. "Settlement work, though predominantly localized, covers a range of active interests as wide as civilization, all of them in course of development." The appendix gives a variety of practical information on principles and methods of administration and activity.

**What Every Citizen Should Know.**—By George E. Dunham. Ginn and Company, Boston, Mass. VIII + 76 pp. 1 illustration. 75 cents.

Questions and answers on the Federal Constitution and laws and on the municipal and state laws of New York. Introduction by John H. Finley. Covering the town, the village, the city, the county, the state, the Federal Government, primaries and elections, and certain important questions on American history. Including also the Constitution and definitions of uncommon words used in it. A clear and straightforward aid to the understanding of citizenship.

**Organizing the Community.**—By B. A. McClenahan, M.A., Assistant Director, Missouri School of Social Economy, St. Louis. Edited by George B. Mangold, Director, Missouri School of Social Economy. The Century Co., New York, 1922. XV + 260 pp. Diagrams. \$1.75 postpaid.

A definite presentation of the principles and methods of helping communities to help themselves, based on actual work in many fields of social service. A book for students and for practical workers. A thorough working manual.

**Community Chests—Their Advantages and Dangers.**—By Harvey Leebron. 32 pp. Diagram. Addresses delivered at Stanford University Summer School of Community Leadership, 1921, at the 1922 California State Conference of Social Work, and in various Community Chest campaigns. This has been found useful in a number of communities, both for preliminary organization and for the conduct of the campaigns. Free to those interested; in quantities less than 1,000, 10 cents per copy; 5 cents per copy if more than 1,000 are ordered. (Apply to Harvey Leebron, Executive Secretary, The San José Community Council, Chamber of Commerce Building, San José, Calif.)

**Central Financing of Social Agencies.**—By W. Frank Persons. A report to the Columbia Advisory Council, Columbus, Ohio, August, 1922. 284 pp. Based upon an inquiry into the principles and methods of organization and operation of the central financing of social agencies in Cleveland, Cincinnati, Detroit, Rochester, Philadelphia, and Louisville, and upon the discussion of the matter in Pittsburgh. Price \$2.00. (Apply to Columbus Advisory Council, 16 South Third Street, Columbus, Ohio.)

**The Cleveland Hospital and Health Survey Two Years After.**—Answering questions about the need, value and results of the Hospital and Health Survey which was begun in Cleveland in November, 1919, and was recorded in an extensive report published in December, 1920. 70 pp. This summary was published in 1922 by the Cleveland Hospital Council, Cleveland, Ohio. (Apply to publishers.)

**A Service Station in Americanization—The Citizens' Bureau of Cleveland.**—Giving full information about this Bureau, which "exists primarily to help the foreign-born residents of Cleveland and Cuyahoga County to become American citizens in law and in fact." 32 pp. Illustrated. (Apply to the Citizens' Bureau, Old Court House, Public Square, Cleveland, Ohio.)

**The Historical Pageant in the Rural Community.**—By Abigail Fithian Halsey. Cornell Extension Bulletin 54, published June, 1922, by the New York State College of Agriculture at Cornell University, Ithaca, N. Y. 24 pp. Many illustrations. A most interesting explanation of the way to prepare and give a pageant in the country, made vivid by views and descriptions of rural pageants that have been successfully given. (Apply to A. R. Mann, Director of Extension Service, Cornell University, Ithaca, N. Y.)

**Tablettes Documentaires Municipales.**—An analytical bibliography, in several languages, of studies and information relative to municipal questions. Mimeographed sheets enclosed in covers under the following divisions: a bibliography of periodicals on municipal affairs; town and city planning; housing; water-supply, sewerage, and waste disposal; light, heat and power. Published from time to time by Union Internationale des Villes, rue de la Régence, a bis, Brussels, Belgium. (Apply to publishers.)

**Replanning Fall River, Mass.**—An elaborate presentation of the need and possibilities of city planning in Fall River as a measure of public economy and efficiency. 20 x 16 inches. 1922. Covering the report of the Planning Board to Mayor Kay on the first, second and third years of service; the report of Arthur A. Shurtleff, town planner, giving both a survey of the problems involved and their solution without reference to technical data, and a second portion of technical matter; tentative draft of a proposed zoning ordinance and plan, by John P. Fox, consultant on zoning; "Legal Aspects of City Planning," by Flavel Shurtleff, member of the Bar; and "Comments on Civic Center," by Harry J. Carlson, architect. 43 pp. Many maps, plans and views. (Apply to Nathan Durfee, Chairman, Planning Board, Fall River, Mass.)

**Efficiency of Various Kinds of Ventilating Ducts.**—By C. E. A. Winslow, Senior Sanitarian, United States Public Health Service, and Leonard Greenburg, Assistant Sanitary Engineer, United States Public Health Service. Reprint No. 773 from the Public Health Reports, July 28, 1922. A study of the uniformity of air distribution attained with ventilating ducts of various designs. 12 pp. Diagram and tables. (Apply to the Government Printing Office.)

**The Reasons for Municipal Ownership.**—By Delos F. Wilcox, Ph.D. From an address before the City Managers' Association at its Eighth Annual Convention, at Kansas City, Mo., November 16, 1922. 16 pp. Published December, 1922. (Apply to author at 436 Crescent Street, Grand Rapids, Mich., or 110 West 40th Street, New York, N. Y.)

**Weights and Measures.—Fifteenth Annual Conference** of representatives from various states, held at the Bureau of Standards, Washington, D. C., May 23-26, 1922. Miscellaneous Publications No. 51 of the Bureau of Standards. XV + 132 pp. Price 15 cents. (Sold only by the Superintendent of Documents, Government Printing Office, Washington, D. C.)

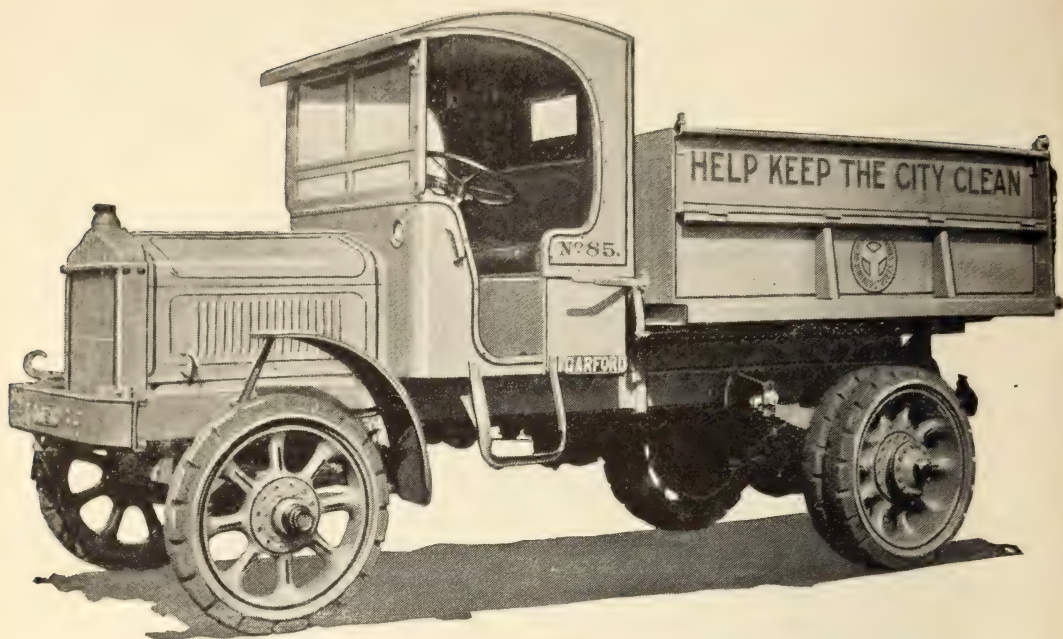
**Sewerage in New Jersey—Report on Methods of Providing Additional Sewerage Facilities for Certain Municipalities in Essex and Union Counties, New Jersey.**—Prepared for the Joint Meeting by Alexander Potter, consulting engineer, 50 Church Street, New York, N. Y. 1922. V + 153 pp. Maps and diagrams. (Apply to author, 50 Church Street, New York, N. Y.)

**The American Civic Association's Park Primer.**—A 4-page leaflet defining in an interesting way a national park, a national monument, a state park, an interstate park, a regional park, a city park, a city playground, and a municipal camp. Price 2 cents. (Apply to the American Civic Association, 905 Union Trust Building, Washington, D. C.)

**Gains Against the Nuisances: II. Noise and Public Health.**—By Willis O. Nance, M.D., Trustee, Sanitary District of Chicago. A paper read at the meeting of the American Civic Association, Chicago, November 15, 1921. Reprinted from *National Municipal Review*, October, 1922. 8 pp. "Most noise is preventable. City noises shorten our lives, besides making them less worth living." (Apply to the American Civic Association, 905 Union Trust Building, Washington, D. C.)

**Milk and Our School Children.**—By Bernice C. Reaney, Associate Professor of Home Economics, University of Tennessee. Prepared for the Bureau of Education by the Child Health Organization of America. 1922. 32 pp. Under the heads, "How Many School Children Drink Milk?" "Why School Boys and Girls Need Milk," and "Milk Facts Made Real," the problem of interesting children in drinking milk is entertainingly handled. The actual steps by which one teacher in Grade III in a school in Nashville, Tenn., solved this problem are presented, and the pamphlet is entertainingly illustrated with reproductions of posters made by the children in this grade. (Apply to the Government Printing Office, Washington, D. C.)





## A Big Truck on a Big Job

**T**HE constant problem of keeping a big city clean calls for sturdy, dependable transportation units.

That's why this big Garford Model 68-D was selected to help in Chicago. In the approximate 200 square miles of Chicago proper the fight to "Keep Clean" is a task to challenge the ingenuity of man.

Regularity in the work is imperative, for even though the system of collection is highly scientific, delays would wreck it in short order.

Garford Engineers know the basic

requirements of sanitary work in a large city. Their experience showed them that this particular Garford had the power, the strength and the capacity to produce economical results.

City and County officials all over the country feel free to consult Garford Engineers in meeting the various hauling problems that arise in municipalities. Have YOU a hauling job that is puzzling? If so write to the Garford Engineers today. No obligation, of course—just a regular part of Garford service.

**The Garford Motor Truck Company, Lima, O.**

Manufacturers of Motor Trucks 1 to 7½ Tons

# GARFORD

## DEPENDABLE TRANSPORTATION



# Methods, Materials and Appliances

News for City and County Engineers, City Managers, Water-Works Superintendents, City Controllers, Park Superintendents, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

## Fencing for Schools and Parks

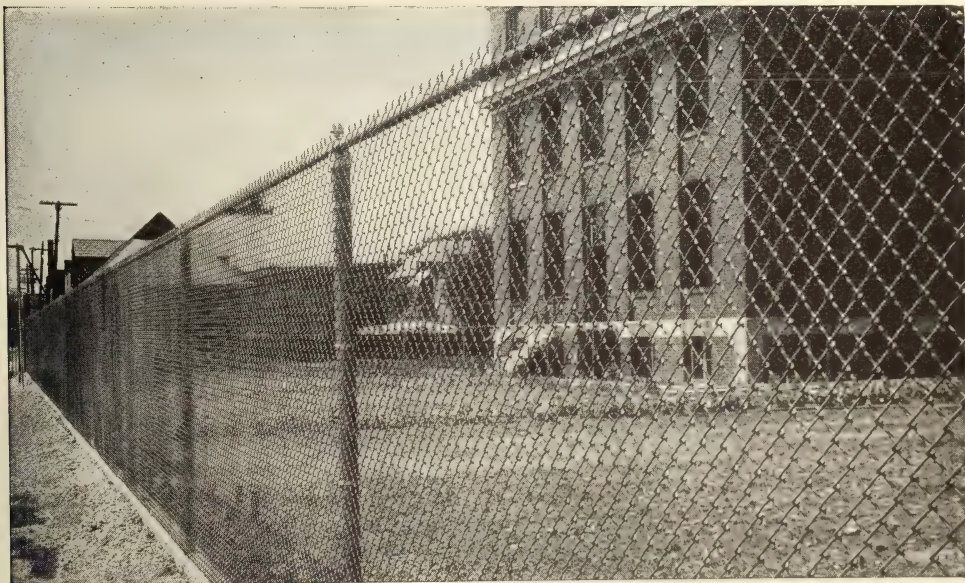
Wire fabric fencing, properly made, is an ideal protective material. Used as an exterior fencing about parks, playgrounds, schools and other municipal properties, it is practically unclimbable. It is proof alike against the petty thief or the more sinister marauder. Statisticians have calculated that the annual loss from theft in exposed plants, estates, and public buildings will aggregate half a billion dollars a year.

It has been found that this wire link fabric, made by the Page Fence and Wire Products Association, 215 North Michigan Ave., Chicago, Ill., also furnishes an ideal partition where it is used in public buildings or schools. Any portion of the floor space may be effectually segregated without the slightest obstruction to light, air, or the general oversight of the entire area. The fencing is vermin- and fire-proof and practically indestructible. The fencing is made in any mesh from ½-inch to 2 inches and in any size of wire from No. 6 to No. 14 inclusive. Probably the most satisfactory weave for nearly all ordinary purposes is a combination of 2-inch mesh from No. 9 or No. 6 wire. Because of the simplicity and neatness of the style O-TR, illustrated below, this is favored for parks, public institutions

and playgrounds. The interlocking weave of the Page wire link mesh makes this fence non-climbable because a foothold cannot be secured in the meshes. It is, therefore, a true protection fence. The illustration shows the substantial appearance and non-climbable nature of the fence. The barbed top of the fabric gives added security against climbing. The fence is 6 feet high and of 2-inch mesh of No. 9 wire.

## A New 3-Ton Motor Road Roller for Diverse Uses

To make it possible for cities and contractors to build more economical concrete roads, the Austin-Western Road Machinery Company, 400 North Michigan Boulevard, Chicago, Ill., is now selling the Austin "Pup," a 3-ton power roller which was brought into existence by the specifications for concrete roads built under the direction of the Illinois State Highway Department. These specifications call for a 3-ton power roller and heretofore there has been nothing of such light weight obtainable except the old-style 3-ton tandem type of roller, which could be used only in a limited way and cost nearly as much as a full-sized roller. This machine is the first 3-wheel power roller weighing less than 7 tons that has been built by this



AN EFFECTIVE AND ORNAMENTAL FENCE SURROUNDING A SCHOOL YARD



# Always Good~Now Better than Ever

## What Makes a Truck Efficient?

First it must be designed as a whole by experienced engineers according to modern truck practice.

Then, each individual unit must be correctly designed and built. Federal's plan of using specialized units, each made according to Federal specifications by the leader in its particular field, assures Federal owners of the best at lowest possible unit cost.

Then, these units must be combined into a well-balanced whole by experienced truck workmen in a well equipped plant.

That Federal does these things well is evidenced by a 12 years' record of success and by the sound financial position of the company. The Federal line of 8 models is most complete.



*In city and county works Federals are operating efficiently. This is the 3 1/2 - Ton Federal of the City of Chicago.*

*Ask for folder S-10 describing the complete Federal line of chassis.*

Standardization of hauling units in all city departments is possible if you select the Federal. There are 8 models, from the Fast Express to the powerful 6-ton truck and heavy duty tractor.

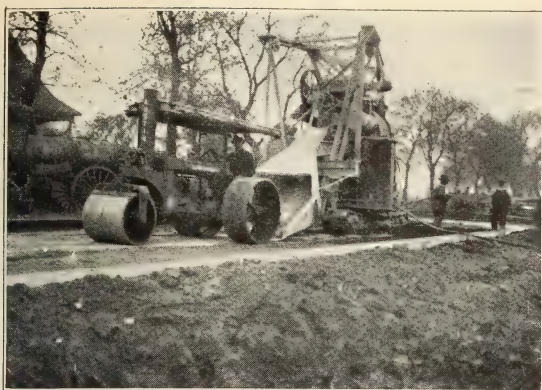
**Federal Motor Truck Company**

DETROIT, MICH.

*Another*

**FEDERAL**

*"Means Another Satisfied User"*



**THIS SMALL ROLLER CAN HANDLE MANY ODD JOBS BESIDES ROLLING ROADS**

company and it has already shown that it is a valuable machine for any city or contractor. In addition to preparing the subgrade by bringing it to a true surface and saving all unnecessary outlay of concrete that would otherwise go to fill depressions in the road, it can be used as a light tractor, as it has ample power to pull a 3-wheeled or drag scraper or fresno or a small road machine or plow. It will do practically everything that a small tractor will do, and at the same time it serves as a very complete and practical road roller.

There are many uses for the machine besides those mentioned above. Gravel and stone roads are frequently built or repaired by simply dumping the new material on the old surface and expecting traffic to wear it in, a wasteful and extremely inefficient method. By using this light-weight machine, the material can be readily compacted, making a much better road than by the old method. Dirt roads can also be rolled to very good advantage, especially after the spring grading or the dragging that follows a rainfall. Parks and cemeteries will find this machine a very handy one for rolling drives and walks, particularly those that are too winding or narrow to accommodate a standard roller.

The machine runs  $1\frac{1}{2}$  miles per hour in low, about  $2\frac{3}{4}$  miles in high, and slightly over  $2\frac{1}{2}$  miles in reverse. It combines the power-plant of a Fordson tractor with the features of the Austin gas roller, which makes it possible to sell the machine at quite a low price.

### **Gas Street Lighting Installations**

Approximately 10,000 Welsbach gas street lights have recently been installed in Cleveland, Ohio, and additional Welsbach street gas lights have been installed in East Orange, South Orange, Camden, Palmyra, Gloucester Township, Passaic, Riverton, Montclair and Totowa, N. J.; Boston, Lowell and Haverhill, Mass.; St. Louis, Mo.; Mount Vernon, Silver Lake Park, Kenmore, Sea Gate and Pelham Manor, N. Y.; Augurville, Centerville and Hamden, Conn.; Brookfield, Ill.; Indianapolis, Ind.; Cleveland, Ohio; Portland, Maine; Oakland,

Calif.; Washington, D. C.; Baltimore, Md., and Pittsburgh, Pa.

Gas street lighting contracts have been renewed in New Bedford, Mass., for one year; Brookfield, Ill., for ten years; Arlington Heights, Ill., five years; Haverhill, Mass., five years; and Mt. Oliver, Pa.

### **New Philadelphia Office for Fuller & McClintock**

Fuller & McClintock, 170 Broadway, New York City, have announced the opening of a branch office at 1001 Chestnut Street, Philadelphia, Pa. The Philadelphia representative will be C. A. Emerson, who for the past nine years has been Chief Engineer of the State Department of Health of Pennsylvania. Previously to his work in Pennsylvania he was connected with the construction

of the water filtration and softening plant at Columbus, Ohio, the preliminary studies, design and construction of the Baltimore sewage treatment work, and other projects.

Fuller & McClintock now have branch offices in Toledo, Ohio, Memphis, Tenn., and Kansas City, Mo., as well as Philadelphia, Pa.

### **Changes in American-LaFrance Staff**

Recent changes have been announced in the selling force of the American-LaFrance Fire Engine Company, Inc., Elmira, N. Y. A. M. Donaher, who has been in charge of apparatus sales for Ohio, has been made manager of the California apparatus sales, with headquarters at San Francisco. Associated with him is V. H. Brown, former California manager of sundry sales, and George H. Herald. Howard M. Karr, who formerly was salesman for the sundry sales department in western New York, has been made branch manager in San Francisco, to succeed Mr. Brown. R. C. Engels, formerly sundry sales branch manager in the New York City office, has taken over Mr. Donaher's territory in Ohio. In Boston, Harry Lovell, former sundry sales manager of the branch in that city, goes on the apparatus sales staff with Joseph A. Webber, and A. H. Kohnen, formerly with the Chicago branch, takes Mr. Lovell's place. Robert Henrich has been transferred from Boston to Elmira. J. J. Egan has been promoted to manager of the sundry sales department branch in New York City.

### **Planning Greater Norfolk**

The City Planning Commission of Norfolk has engaged the Technical Advisory Corporation, 132 Nassau Street, New York City, as consulting engineers for the formulation of plans for a greater Norfolk. Among the first problems encountered are the selection of a site for the new municipal auditorium and the framing of a zoning plan. It is expected that the entire plan will be completed by January 1, 1924.



*Around the World  
on Native-Lake  
Asphalt.*



Trinidad in Brazil—The Avenida San Joas, one of the many splendid Trinidad Lake Asphalt pavements, city of San Paulo



**M**ILLIONS of square yards of Trinidad Lake Asphalt paving—on the world's finest streets—from one to 43 years old—are visible proof of its quality and ability to stand traffic.

No other type of city pavements even approaches it in long-lasting, low cost service. Nor in attractiveness, ease of cleaning, ease of repair and freedom from noise.

Trinidad Lake Asphalt is a product of the ages. Countless centuries of exposure to the suns, winds and storms of the tropics have but seasoned and toughened it—made it practically immune to damage by weather.

No wonder Trinidad Lake Asphalt is the "Standard Street Paving Material of the World!" Write at once for the "service records" of this nature-made, aged-tested product.



The Genasco Line includes asphaltic roofing, flooring, paints and allied protective products. Write for descriptive matter.

New York  
Chicago  
Pittsburgh

**THE BARBER ASPHALT  
COMPANY**  
PHILADELPHIA

St. Louis  
Kansas City  
Atlanta

**TRINIDAD LAKE ASPHALT**



CHICAGO'S NEW "STOP" SIGN  
FOR CROSS-STREETS

### Street Traffic Control

During the last year the matter of traffic regulation has been drawn to the attention of various municipal officials more forcibly than ever, not only in the larger cities but in many smaller towns. Chicago has experienced considerable trouble in regulating the movement of traffic, because of the vast extent of the city as well as the congested condition of the streets and boulevards. The problem has been practically solved, however, and automobilists given additional reason for a feeling of safety from the standpoint of right of way over other traffic, by reason of the designation of six more streets upon which "boulevard rules" will apply. These rules require that all vehicles entering from cross-streets shall stop before entering or crossing the boulevard.

All the latest streets to come under this rule are on the south side of Chicago and bring the total number of such thoroughfares, including those previously designated on the north side, up to seventeen, and it is expected that several west side streets will be added very soon. The contract for over 1,000 "Stop" signs for designating the through streets at all crossings was awarded to the Union Iron Products Company, East Chicago, Ind. The design was worked out with the assistance of Charles R. Francis, Commissioner of Public Works, and William Burkhardt, Deputy Commissioner. The sign is of heavy-gage steel, shield-shaped, approximately 15 x 20 inches in size. All of the lettering is of countersunk construction and finished in the best grade ground aluminum paint. The upper half of the sign has a black background and 2-inch letters reading "Through Street," and the lower half has a blood-red background with 5-inch letters reading "Stop." The sign is finished with elastic baking enamel, baked on at high

temperature for a sufficient length of time to insure durability.

This company has for a number of years been manufacturing a complete line of highway markers, semaphore outfits, "No Parking" signs and warning signals. The improved brass name plate which it is making has been adopted as standard equipment in many cities, among which are Dubuque, Iowa, Centerville, Iowa, Parkersburg, W. Va., Pontiac, Mich., San Antonio, Texas, Waupun, Wis., Onarga, Ill., Indiana Harbor, Ind., Indianapolis, Ind., Struthers, Ohio, East Youngstown, Ohio, and Findlay, Ohio.

### Combining Fly-Traps with Garbage Cans

Within the last year T. H. Benton, Rialto Building, San Francisco, Calif., has brought out a fly-trap which is claimed to effect a considerable improvement in sanitary conditions where it is used. Ingress to the trap, which is mounted on a garbage can, is through a small hole leading to a drawer in which the bait, such as a pinch of sugar, is placed. The drawer also facilitates the removal of dead flies. It is impossible for the flies to escape after entering the trap, because of its construction. It has been successful in catching not only house and stable flies, but ants as well. A number of cities and towns in California are considering passing laws requiring its use around dwellings, markets and other public places where flies are likely to gather.



GARBAGE CAN EQUIPPED WITH FLY-TRAP

### New Address for S. A. Arnold

Sheffield A. Arnold, landscape architect, formerly at 50 Bromfield Street, Boston, Mass., has moved to 230 Boylston Street, in the same city.





# No Legal Liability

Can accidents be caused by traffic lights?

Is the city liable under the law?

If lamps burn out—if electric current is shut off—if the light is obscured by rain or snow—what's to hinder accidents?

Why not a car jolted from its course, and a smash into other cars—into curb, or worse?

Can a judgment for damages be secured against the city?

*Write us now for catalog and prices—and still better, let us furnish a sample for test.*

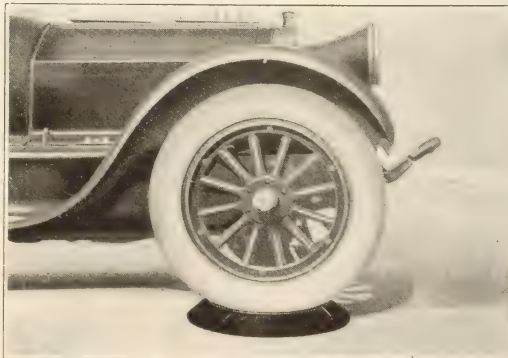
*Just ask your city attorney. Just ask him about grounds for action for damages for negligence and for maintaining a public nuisance.*

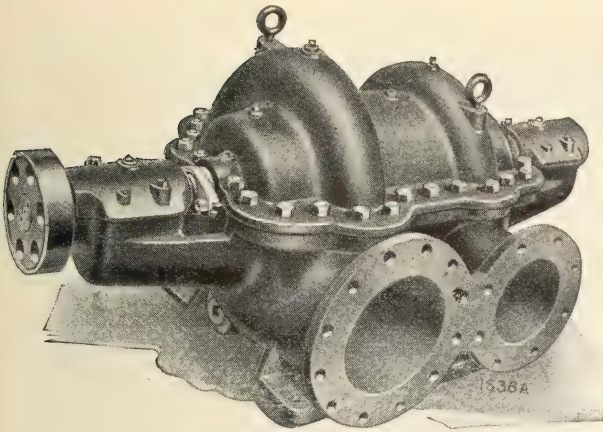
*There's one safe light—the light with the Disappearing Dome.*

Does its full duty as a traffic guide—but will never injure, or kill anyone, or involve your city in law suits.

If inadvertently hit, it yields—let's a car pass over with no damage to car or light. Public opinion is *with* this light.

**SAFETY TRAFFIC LIGHT MANUFACTURING COMPANY**  
425 East Water Street  
Milwaukee, Wis., U. S. A.





A NEW TWO-STAGE SERIES PUMP

### High Efficiency in Centrifugal Pumps

Many water-works engineers are not aware of the high efficiencies that can be obtained in centrifugal pumps by the use of a properly designed and proportioned volute, rather than by the use of diffusion vanes. That high efficiencies are obtained with volute diffusers is demonstrated by a number of official tests on volute type centrifugal pumps in water-works service. For example, one installed at the municipal water-works in Minneapolis has maintained the uniformly high efficiency of 86 per cent over a period of four years, during which time no replacements or repairs whatever have been made to the pump. Another, at Toronto, showed an efficiency of 87.2 per cent in a recent official acceptance test.

The Minneapolis and Toronto pumps are single-stage machines. Where pumps driven by motors of slow or moderate speeds must deliver water at pressures higher than are desirable or profitable for a single-stage pump, instead of using a single-suction, multi-stage pump, two separate single-stage pumps are sometimes connected in series, so that one discharges into the suction of the other. This method has frequently been adopted, particularly in water-works service. In medium and smaller sizes the use of two independent pumps in series becomes somewhat more cumbersome, and a multi-stage pump is more often used.

However, it is not possible to obtain as high efficiencies with a commercial multi-stage single-suction pump as would be possible in a single-stage pump with double-suction impellers, not only because of the less favorable limitations imposed on the impeller, but also because there is not sufficient space for an efficient volute diffuser and suitable return passages leading from the diffuser to the eye of the succeeding impeller. The De Laval

Steam Turbine Company, Newark, N. J., has developed a new type of multi-stage pump, known as a "series" pump, in which the advantages of the double-suction impeller are retained. This is made possible by the use of a specially formed casing which provides individual volutes for each impeller with ample interconnecting passages within the casing itself.

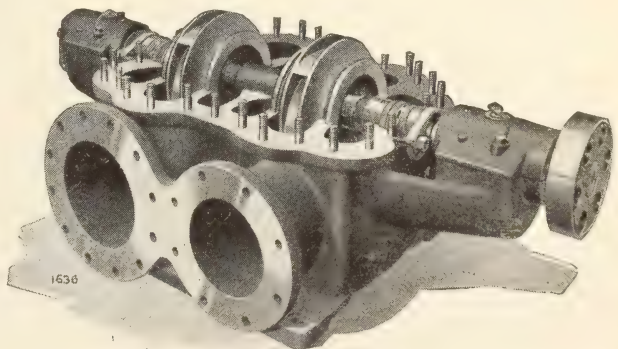
### Cleveland Now Associated with Vermeule

H. Burdett Cleveland, well known in the sanitary engineering profession through his fourteen years' service from 1905 to 1919 as Principal Assistant Engineer of the New York State Department of Health and later for three years as Secretary and Consulting Engineer of the Barth Engineering and Sanitation Company, has opened a consulting engineering practise in association with Cornelius C. Vermeule, consulting engineer, 38 Park Row, New York City.

### Pocket Coin Demonstrates Water Waste

As a means of helping water-works superintendents, a coin  $1\frac{1}{4}$  inches in diameter is being distributed gratis by the H. W. Clark Company, Mattoon, Ill. This coin contains small holes  $1\text{-}32$ -,  $1\text{-}16$ - and  $1\text{-}8$ -inch in diameter, with figures under each hole indicating the leakage in gallons per 24 hours at 40 pounds pressure through holes of these sizes. The leakage through the  $1\text{-}32$ -inch hole is 180 gallons, through the  $1\text{-}16$ -inch hole, 960 gallons, and through the  $1\text{-}8$ -inch hole 3,600 gallons.

This coin will aid the water-works superintendent or manager materially in suppressing waste. In metered service it assists in convincing the consumer of the correctness of registration of the meter where known leaks exist.



DE LAVAL TWO-STAGE SERIES PUMP WITH CASING COVER REMOVED





## The Ideal Road Preservative

**C**ALCIUM CHLORIDE in its pulverized form is one of the best preservatives for macadam, gravel or dirt roads. Through its power to absorb  $1\frac{1}{2}$  to 2 times its own weight of water from the air, it prevents dust. It is readily spread on the road by an ordinary scoop shovel or a horse-drawn distributing machine like a lime spreader, as shown above, at a cost of about 2 cents per square yard.

### **73% to 75% PULVERIZED CALCIUM CHLORIDE**

Carbondale Calcium Chloride is shipped in 400-pound drums which contain sufficient material to treat a road 18 feet wide by 130 feet long at the rate of  $1\frac{1}{2}$  pounds per square yard. Calcium Chloride is not injurious to rubber, varnish, paint, etc., and is only washed off the road by the heaviest rains that would carry away some of the road surface.

*Send for our Booklet "An Ideal Road Preservative."*

**CARBONDALE**

CARBONDALE



**CALCIUM CO.**

PENNSYLVANIA

#### **BRANCH OFFICES**

NEW YORK

CHICAGO

PITTSBURGH

NEW ORLEANS

BALTIMORE

PHILADELPHIA



A "ROAD RAZER" EQUIPPED WITH SNOW-REMOVAL BLADE, CLEANING SNOW FROM AN UNPAVED STREET IN THE SUBURBS OF PEORIA, ILL.

### Protecting Winter Business

It has been stated that the business of the United States loses about one-half billion dollars through traffic tie-ups in the winter months. The February blizzards of 1920 in New York City are now taken as classic examples of such losses. New York City at that time lost nearly \$60,000,000 in business. Smaller communities possibly have larger proportionate losses. The "Road-Razer" made by the Avery Company, Peoria, Ill., has been found particularly effective in many communities for year-round work. It handles the smoothing and grading of rough dirt roads in summer, and in winter has been very effective in removing snow quickly, easily and at low cost.

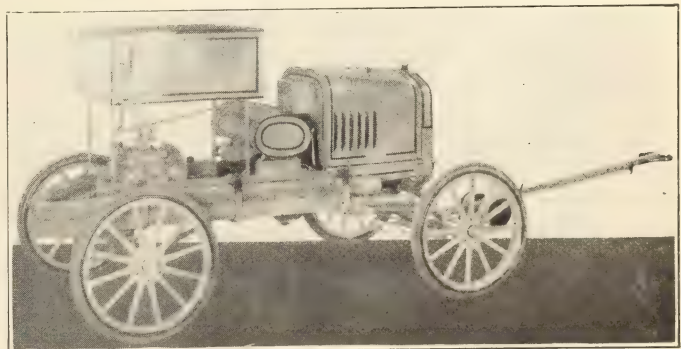
### A Fire Engine Unit for Small Villages

In the "Village Queen" pumping engine recently brought out by the American-LaFrance Fire Engine Company, Inc., Elmira, N. Y., small communities will find an efficient pumping unit, weighing only 1,500 pounds, which can be readily hauled by hand or any automobile or truck. The engine consists of an American-LaFrance rotary gear pump, driven by a 4-cylinder gasoline motor. The unit is mounted on a pressed steel frame, carried on half-elliptic springs and equipped with rubber-tired wheels. The front axle has a large hand pole with a rope reel

and 50 feet of manila rope for drawing the engine by hand or for attaching it to an automobile or truck.

The 4-cylinder motor is used only for driving the rotary gear pump. A 10-gallon gasoline tank is mounted between the motor and the pump for furnishing fuel for the motor, and the radiator is mounted at the front end of the frame for cooling. An auxiliary cooling line connecting the discharge end of the pump with the water inlet on the motor furnishes a fresh supply of water to keep the motor cool while pumping. A shut-off valve in this line is provided at the pump for controlling the supply of water to the motor. The radiator is equipped with an overflow pipe to take care of any surplus water-supply for the motor.

The rotary gear fire pump is of the positive displacement type, the connection between the pump and the motor being made at the rear end of the transmission with the proper gear reduction. The pump is equipped with a 2½-inch suction inlet with strainer and one 2-inch discharge connection with the necessary gage. The pump can handle approximately 200 gallons of water per minute at 60 pounds pump pressure, or 100 gallons per minute at 100 pounds pump pressure. Three lengths of 2½-inch I.D. hard suction hose, 7 feet long, complete with heavy couplings, are furnished with the outfit, together with an outside suction strainer. The sheet steel hose box has a capacity of 300 feet of 2-inch cotton rubber-lined single-jacket hose coupled in 50-foot lengths. The entire apparatus is painted fire department red, striped with black and white. This makes a very striking and efficient fire department unit for any small community.



A LIGHT-WEIGHT, SMALL-TOWN FIRE ENGINE FOR HAULING BY HAND OR AUTOMOBILE



# Beautiful Dustless Roads In Town and Country



Lays the dust without inconvenience to pedestrians. No tracking, no staining. Solvay is quickly applied by the common street laborer.

Solvay binds the surface and lays the dust. Economical and easy to handle.



## SOLVAY CALCIUM CHLORIDE

*"The Natural Dust Layer"*

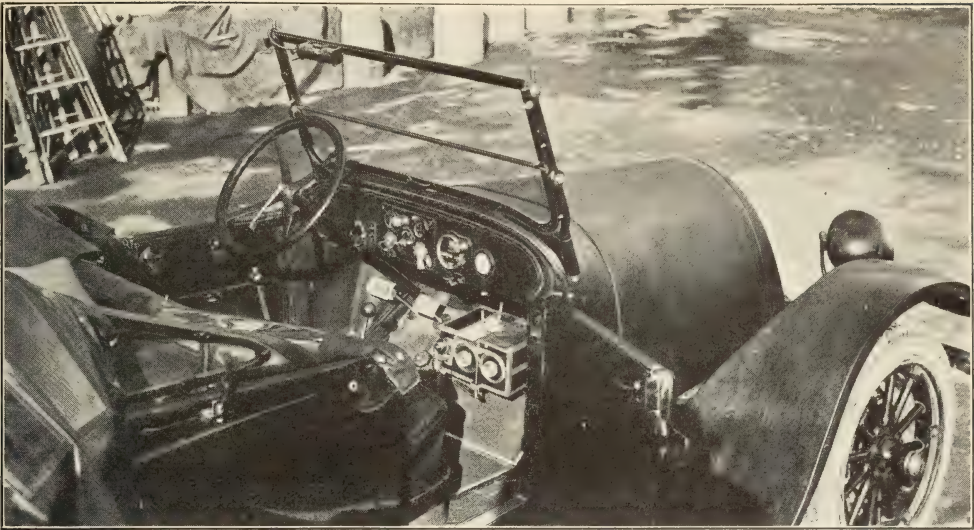
A clean, odorless, white chemical salt which lays the dust and is a perfect surface road binder.

Solvay keeps roads in wonderful condition; no ruts, no running on hills, no puddles in hollows. It is the perfect material for town and country road treatment. Economical in use and application—efficient in action.

Thirty-five conveniently situated distributing points assure prompt delivery and minimum transportation charges.

*Write for the Solvay Road Book!*

**SEMET-SOLVAY COMPANY, Syracuse, N. Y.**



MACHINE MOUNTED ON DASHBOARD OF AUTOMOBILE FOR MEASURING THE ROUGHNESS OF ROADS

### New Instrument Records Condition of Roads

A new recording instrument designed for the use of highway engineers for making a record of the road surface has recently been placed on the market by the Universal Road Machinery Company, Kingston, N. Y. This machine, the first of its kind, is mounted on the dashboard of the automobile, as shown in the accompanying illustration. It is a compact instrument built entirely of aluminum. Within the box containing the instrument is a paper chart 6 inches wide, driven by a flexible shaft connected to one of the front wheels. Two recording pencils are actuated through connection with the front axle. The paper is furnished in length sufficient for the inspection of 11 miles of road. A clutch is provided so that the instrument can be operated or disengaged at will.

As the automobile is driven over the road, the chart moves in direct ratio to the distance traveled, one inch on the chart for each 50 feet of road, and the recording pencils, resting on the paper, make a series of irregular or straight lines, depending on the condition of the pavement. In this way the depressions and high spots are located, measured and recorded. The moving paper chart is in plain view at all times, so that notes and topography may be sketched in as the inspection is carried on. This also affords means for measuring the length of the road, locating culverts, ditches and property lines. The irregularities in the pavement are also automatically summed up, so that the observer at any time may read off the sum of the irregularities passed over by the car. This information may be reduced to inches of irregularities per mile of pavement by a simple calcu-


lation. This is found to be useful in comparing various types of pavements or various pavements of the same type as built in actual practise.

### A New Stop-and-Go Traffic Signal

Traffic control problems are becoming more complex all the time, making the use of traffic control signals increasingly imperative. A new development in traffic control equipment was shown at the Good Roads Show in Chicago last month. This system of traffic control brought out by the Essco Manufacturing Company, Peoria, Ill., producers of the mushroom traffic light, provides a line of differently designed units for various combinations of circumstances. There are lanterns of various sizes, adapted for center suspension, mast arm mountings, bracket supports or individual post supports, and a street unit of the mushroom type which shows a changing signal in each direction and an auxiliary indicator for low signaling purposes. The control of the system is as flexible as its grouping. It is possible to have either manual control, semiautomatic control, automatic control, or synchronous control, or any combination of these.

All units are built with the three-lens arrangement that is becoming standard; that is, three colors, denoting stop, go and traffic change. The lenses are  $8\frac{3}{8}$  inches in diameter and are backed up by a special silvered glass reflector that gives a remarkable visibility, not only when viewed from directly in front, but when viewed from the side. Phantom signals have been overcome, and what is claimed to be a remarkable daylight signal has been produced. Lamps of 25 watts are used in all units, one to each lens, giving a clear, distinct signal.





## TO MAKE YOUR TOWN WORTH LIVING IN

Small cities, rural communities and the outlying districts of the big cities probably suffer more inconvenience and discomfort from dust than from any other source.

The dust nuisance makes a good town look like a careless town. Every passing vehicle puts more dust on the furniture and in the food. Dust makes more work for the housewife—makes the trimmest lawn and gayest flower bed look dead and dull.

After years of experimenting with costly water sprinkling and with sticky messes of various kinds, road men have now found the way to eliminate the dust nuisance for the entire season and to bind road surfaces at the same time and thereby lengthen the life of the road.

The modern method is to distribute a white flaky chemical salt on the roads twice each season. This chemical, called DOWFLAKE comes in 100 lb. moisture proof bags and is distributed on the road with an ordinary lime spreader. No expensive machinery is necessary or desirable.

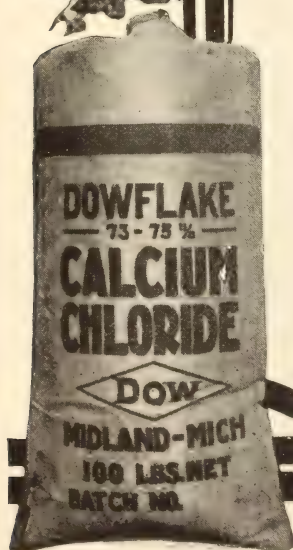
DOWFLAKE binds and dustproofs roads by keeping them moist and firm. It begins to absorb moisture from the air as soon as it is spread on the road. It absorbs several times its weight in water, dissolves itself—and holds the moisture for months.

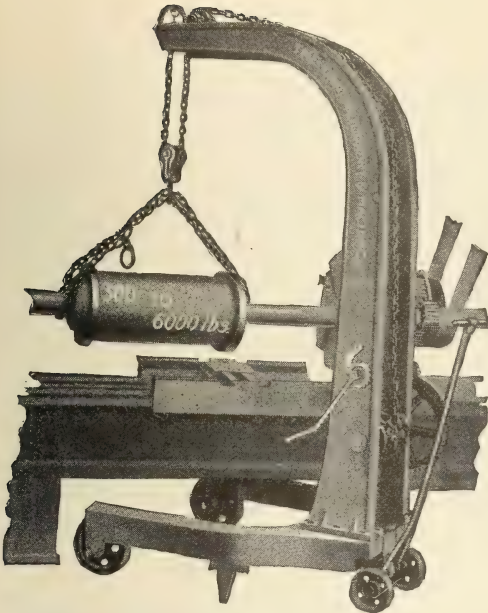
"How to Maintain Roads" is a new book on Dust Prevention and Low Cost Road Maintenance. Write for your copy today.

**THE DOW CHEMICAL CO., Midland, Mich.**

*Eastern Office:*

90 West Street, New York City





**A PORTABLE CRANE USEFUL IN MUNICIPAL MACHINE SHOPS, GARAGES AND POWER-PLANTS**

### **A Handy Crane for Power-Plants and Garages**

In municipal power-plants it is frequently necessary to lift some small piece of machinery which requires the lifting power of four or five men. In many plants this makes it necessary to call in all the men about the plant, some high-paid men, and to take laborers away from their regular work. Those plants, however, which are equipped with a Canton portable crane made by the Canton Foundry and Machine Company, 203 East 15th Street, New York City, will find that one man can readily handle most of the lifting jobs. This crane, illustrated above, is strictly a one-man tool. It goes quickly where nothing else can reach, into corners, under balconies and around machines. It is claimed that it will handle more work in less time than six strong men could do without it. The crane is made in two styles—the low base, 6¾ inches high, and a high base, 12 inches high. The low base is recommended for garage work, and the high-base crane will handle practically all work where headroom is not a question. The crane is made of semi-steel, furnished with guaranteed hand-forged tested chains, so that it is almost impossible for it to wear out.

### **An Auxiliary Cutter for Trench Excavator**

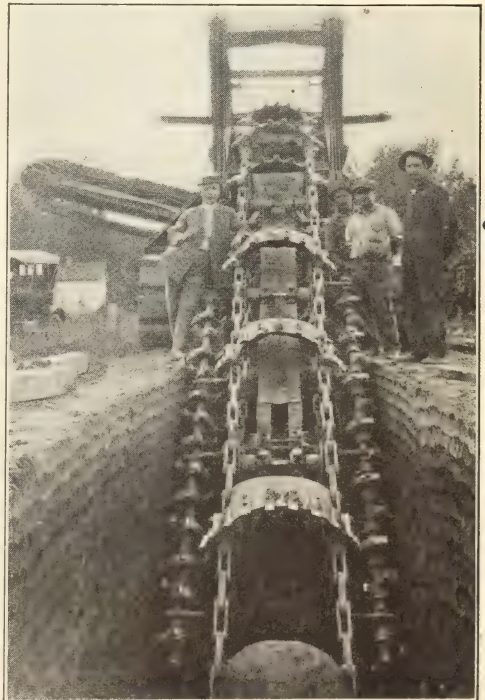
A new trench excavator attachment by means of which the cutting range of trench excavators is greatly increased without changing the bucket, has been developed by the Buckeye Traction Ditcher Company, Findlay, Ohio.

This new rotary auxiliary cutter, as the device is called, makes it possible to cut with one machine trench work which would formerly have required two different models. This materially increases the variety of trench work which it is possible for a city to handle with one machine. The various models of this machine now cut trenches all the way from 24 to 76 inches in width.

The auxiliary cutter consists of two shafts, one on each side of the boom, each shaft being fitted with steel cutting teeth. As the shafts revolve, these teeth dig into the trench side walls, outside of the bucket, giving an extra cut on each side. The shaft supports are adjustable, permitting variations of cutting widths when desired. The auxiliary cutters require no additional power, as they take the load off the regular bucket side cutters. Power is transmitted by heavy steel roller chains operated from the shaft that drives the digging bucket. Four men, in two hours, can attach or remove the auxiliary cutter, which can be used with any Model C Buckeye excavator.

### **Fairchild Aerial Camera Corporation Expands**

The Fairchild Aerial Camera Corporation, 136 West 52d Street, New York City, has recently opened a branch office in Dallas, Texas, to handle its work in the states of Texas and Oklahoma. The offices are located in the Adol-



**THE SIDE CUTTERS SHOWN INCREASE THE EFFICIENCY OF THIS TRENCHING MACHINE**



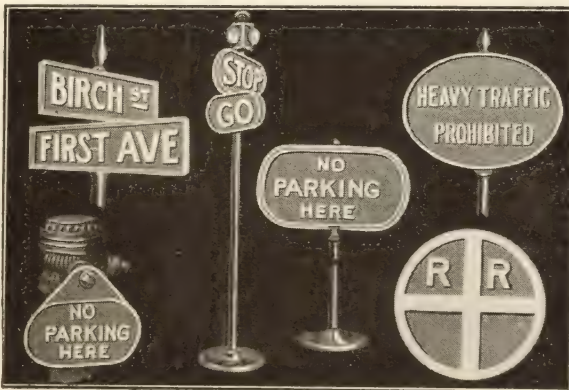
## MAKE BETTER ASPHALT STREET REPAIRS



**The Improved Lutz Surface Heater Softens 1500 Square Yards a Day**

Proper bonding of old and new asphalt is made possible by this fool proof machine which requires hot water to operate. The heating hood slides on the ground saving time and heat. The machine heats 45 square feet of pavement in 1 to 2 minutes and moves quickly ahead. Send for our new prices and specifications.

**THE EQUITABLE ASPHALT MAINTENANCE COMPANY**  
**1901 Campbell Street** **Kansas City, Mo.**



## Wearproof Signs and Street Name Plates

also

Public School and Quiet Zone Signs, Turtle Back Traffic Guides, and Automatic Danger Signals.

*Write for Catalog.*



**THROUGH STREET STOP SIGN  
 USED BY CITY OF CHICAGO**

**UNION IRON PRODUCTS CO., East Chicago, Indiana**

**DRAWER H**

phus Hotel. Horace D. Greenfield, formerly of New York, is acting as Southwestern representative. An operating crew is already in Texas, and active production will start immediately.

Clyde H. Butler has been appointed representative of the company in northeastern Ohio, and J. A. Newcomb, Jr., in Birmingham, Ala. L. B. Roberts, former Major, 29th Engineers, U. S. Army, and for some ten years with the U. S. Geological Survey, has recently become associated with the Fairchild Aerial Camera Corporation as Director of Engineering. Major Roberts was formerly a member of the engineering staff of Colonel William Barclay Parsons. Plans of the Fairchild Corporation are now formulated for the making of both photographic and topographic maps on various scales and according to recognized engineering standards.

On January 11 a very interesting exhibit of aerial photography, topographical surveys and mosaic maps, prepared from aerial photographs, was given at the home offices of the Fairchild Aerial Camera Corporation. Among the interesting exhibits was the new mosaic map of Kansas City, Mo., made for the City Planning Commission of that city and the now famous mosaic map of New York City.

### A Self-Closing Waste Receptacle

A waste receptacle that closes itself tight, thus preventing the spread of any fire which might start within the can, and which also keeps out flies, odors and the sight of waste material and prevents rain from getting in, has been brought out by the Economy Baler Company, Ann Arbor, Mich. The receptacle is neat in appearance, and whether it is set up level or not, always closes itself tight.

This waste can is made in four sizes from 12 x 12 x 18 inches to 22 x 22 x 36 inches and is finished regularly in green enamel or in white enamel at a small additional cost, and in grain mahogany, walnut or oak enamel on special order. For street use and in parks, the weather-proof baked green enamel with "Help Keep the City Clean" on two sides and "Waste Paper" on two sides is usually ordered. The can is equipped with a bag container which permits easy and quick emptying. This feature eliminates the necessity of removing the receptacle, thus prolonging its life and finish. The bag container also eliminates the extra man needed to dump the old-fashioned, open-top can and prevents the paper from blowing around when removed. The accompanying illustration shows one of these cans in use near the White House grounds in Washington.



A WASTE CAN IN THE PARK OPPOSITE THE WHITE HOUSE GROUNDS, WASHINGTON, D. C.



# THE WORTHINGTON MOWER



WORTHINGTON TRACTOR AND "CONVERTIBLE QUINT"

## SPECIAL FEATURES OF THE "CONVERTIBLE QUINT"

Third section may be attached to any Shawnee Triple at present in service and instantly detached by removing a single kingbolt.

Triple mower cuts swath of seven feet.

Quint attachment increases swath to eleven feet four inches—a gain of 65 per cent.

The public is advised that the combination of gang lawn mowers with mower tractor, either of the draft or push type, is fully covered by U. S. Patents issued and pending, owned or controlled by this company; that the sale of any tractor used in combination with a gang mower may render the vendor or user liable for infringement. This company will protect its rights.

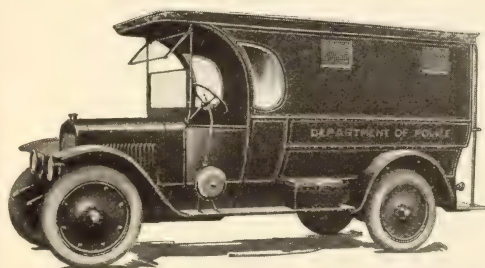
**WORTHINGTON MOWER COMPANY**

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53 West Jackson Blvd.

NEW YORK  
8 West 40th Street

Shawnee on Delaware, Pennsylvania

MONTREAL  
109 Youville Square



## AMBULANCES and PATROLS

For more than a quarter of a century Hoover vehicles have been faithfully serving the public. Every equipment is "custom-built" designed for mounting on any type chassis desired.

This policy allows the ideas of the purchaser to be incorporated in the body, thus meeting all requirements exactly.

The above illustration shows the type patrol used by the city of Cumberland, Md.

Our new catalog will interest you.

Write Department M for information.

**HOOVER BODY CO.**  
YORK, PENN.

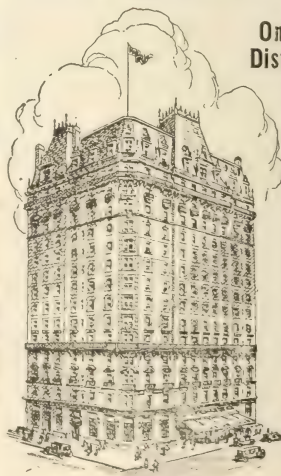
Eastern Sales Branch—Long Island City, N. Y.

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Under Hotel McAlpin Management

Broadway, 32nd-33rd Sts., New York

One of New York's  
Distinguished Hotels



The Martinique offers comfortable rooms at moderate rates, and in its dining rooms, which are most attractive, one finds the best food, well served and at reasonable prices; Club Breakfasts, Special Luncheons and Dinners, or a la carte service if preferred.

The hotel is situated in the center of things in general, being convenient to shopping and wholesale districts and adjacent to the theatre section.

There is an entrance from the hotel to the New York Subways and Hudson Tubes, affording direct communication with the Pennsylvania, Grand Central, and Railroad Stations at Jersey City.

FRANK E. JAGO

RESIDENT MANAGER.

600 Rooms—\$2.50 and up

# What Means to *Engineers and Contractors*

"Kyrock" is the trade-mark of the Kentucky Rock Asphalt Co., the oldest and the largest producers of Rock Asphalt in America.

\* \* \*

The Kentucky Rock Asphalt Company is vitally interested in the success of "Kyrock" roads. Its engineering department co-operates with engineer and contractor until the pavement is completed.

\* \* \*

"Kyrock" mean uniformity. Not only is the rock tested in the quarries, but each ton is subject to laboratory analysis after it is pulverized.

\* \* \*

Experienced in the many difficulties of producing Rock Asphalt and transporting it from the rugged hills of Kentucky, and mindful of costly delays in highway construction, this company is careful to accept no contracts in excess of its ability to produce the material.

\* \* \*

"Kyrock" means quality and service.

*Write for our new brochure on new construction, re-construction and maintenance. Ask for Booklet D-4*

**Kentucky Rock Asphalt Co.**  
(INCORPORATED)

712-718 Marion E. Taylor Bldg.

Louisville, Ky.





## A REAL CUSHION TRUCK TIRE

*At the left is seen the famous All-Weather Tread and the Indented Sidewall of the new Goodyear Cushion Truck Tire. Right—a cross-section showing the Goodyear Patented Hollow-Center*

Goodyear has produced a real cushion truck tire embodying both the original Goodyear Hollow-Center Cushion and the famous All-Weather Tread.

It unites in one tire the resilience of the cushion, the wearing quality of the solid, and the tractive power of the All-Weather Tread.

It is a development of the standard Goodyear Hollow-Center Cushion Tire, more than 30,000 of which have been proved in actual service during the last five years, and it is a distinct advance on that splendid tire.

The Goodyear All-Weather Tread Cushion Tire has a pressed-on base that defies base-separation troubles.

Its tread is the powerfully tractive All-Weather Tread design, insuring sustained headway under all road and weather conditions, saving fuel and

engine strain by its sure gripping.

Its triple cushion design makes it a real shock absorber, resilient beyond any other tire excepting the pneumatic. It has the advantage of the patented hollow-center, the high, thick blocks of the All-Weather Tread, and a new sidewall pattern that permits easy compression under pressure.

The Goodyear All-Weather Tread Cushion Tire is made in all standard sizes, up to and including 7 inches, and is specified for all-round equipment on light and medium duty vehicles and as front wheel equipment with Goodyear All-Weather Tread Solids on the rear, for heavier trucks.

For further information, write the Government Sales Department at Goodyear, Akron, Ohio, or Los Angeles, California.

*In placing orders for new apparatus, you should definitely specify this Cushion, unless your needs are for Goodyear All-Weather Tread Solids or Goodyear Cord Truck Tires*

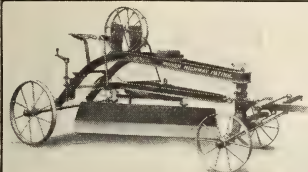
**GOODYEAR**



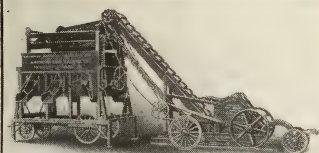
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# ROAD MACHINERY

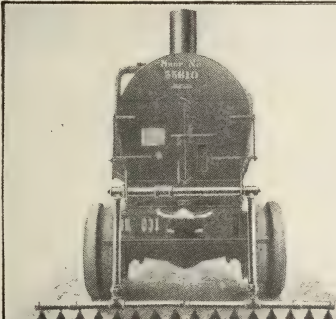
*that pays for itself*



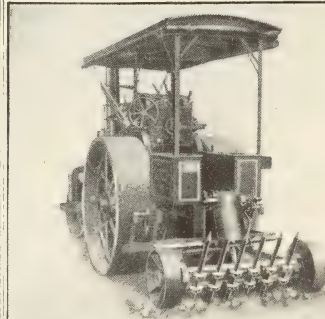
WINNER HIGHWAY PATROL ROAD GRADER. Winner Graders are made in six different sizes.



NO. 4 CHAMPION STEEL ROCK CRUSHER, Mounted, with Elevator, Screen and Portable Stone Bin.



CHAMPION HEATING DISTRIBUTOR  
For applying all grades of bituminous binders.



MONARCH STEAM ROAD ROLLER, with Scarifier Attached. Made in 10 and 12 ton sizes.

*The*

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OUR COMPLETE CATALOG  
"EVERYTHING for the ROADMAKER"  
WILL INTEREST YOU. IT IS FREE ON REQUEST

A piece of road building equipment that pays for itself in the returns it brings to the user is an investment.

*That's the kind of Road Machinery you want, —it's the kind we furnish. It's the kind that means satisfaction to you as a buyer.*

We furnish a complete line of Road Building Machinery. Six different sizes of Road Graders, Portable and Stationary Rock Crushers, Elevators, Screens, Conveyors, Bins, Oiling Machinery, Heating Kettles, Road Drags and Culvert Pipe.

If you are looking for high grade machinery and genuine service we would like to hear from you.



# General Motors Trucks



## Used By Detroit Police

G M C chassis list at the factory as follows: 1-ton \$1295; 2-ton \$2375; 3½-ton \$3600; 5-ton \$3950; tax to be added.

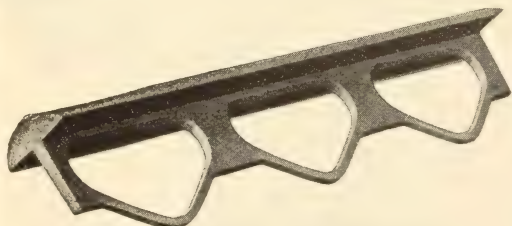
A variety of hauling is given to the one-ton G M C truck used by the Detroit Police Department in connection with its motorized patrol system. This sturdy truck is used particularly for rush delivery of materials within the department and is one of several G M C's that are owned by the Michigan metropolis.

## GENERAL MOTORS TRUCK COMPANY

*Division of General Motors Corporation*

**Pontiac, Michigan**

DEALERS AND SERVICE IN MOST COMMUNITIES



1 5/8" Protection Edge for Concrete Curbs

Owing to their rigidity and convenient size, **Truscon Curb Bars** are easy to handle and install. Concrete curbs protected with **Truscon Curb Bars** make the best and most economical curbing for either business or residential streets.

### TRUSCON EDGE PROTECTOR

The **Truscon Edge Protector** follows the same general principle of design and manufacture as **Truscon Curb Bars**, differing only in that it provides a 1" protection edge instead of 1 5/8". The smaller protection is entirely ample for many conditions such as in the exposed corners of walls, pilasters, columns, platforms and sidewalks.

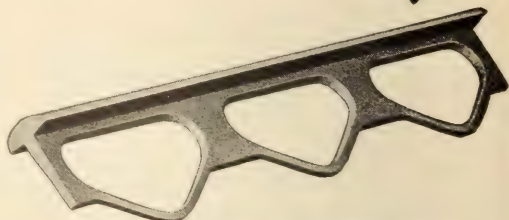
**TRUSCON STEEL COMPANY**  
YOUNGSTOWN, OHIO

*Sales Offices in Principal Cities*

## TRUSCON CURB BARS

**Truscon Curb Bars** provide a substantial protection and reinforcement for concrete curbs. They are manufactured from rolled steel sections under powerful machinery.

The plate and anchorage are formed from the same section of steel insuring uniform distribution of shocks throughout the concrete and preventing the loosening of the plate. The anchorage is positive and is entirely independent of adhesion of the concrete. Owing to the open spaces in the anchorage, there is no separating or splitting of the concrete at the corners.



1" Protection Edge for Exposed Corners.

# THE NEW ERA

## Reinforced Concrete Roads

"The recognition of the structural capabilities of concrete reinforced with steel opened up a new era in engineering design and construction." — "*Engineering News-Record*," Editorial Review, January 5, 1922.

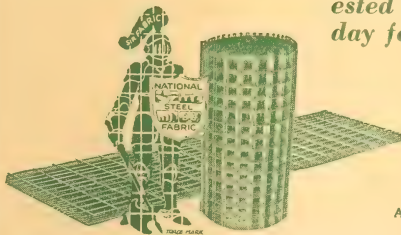
You believe that temperature changes and change in moisture content cause movement of the subsoil, vary the support, and are, therefore, definite causes of failure of road slabs—

You believe that a monolithic covering or slab is necessary in order (insofar as humanly possible) to protect the subsoil against movement, **and also** to provide a road surface of such smoothness that there will be no intensification of tensile stresses—

You believe that intermittent tensile stresses, **as well as** immediate impact shocks from above, play an important part in the impairment of road slabs— Then you must accept the principle of **reinforced concrete roads**.

*National Road Fabric, the Protector of Concrete Roads, reinforces and preserves the integrity of concrete pavements and prolongs their life.*

*Our catalogue will be found of value by all Engineers, Highway Officials and Contractors interested in Good Roads—Modern Roads—write to-day for your copy.*



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PITTSBURGH, U.S.A.





**14 YEARS OLD**  
**NEWARK**

Texaco Asphaltic Concrete on 6th Avenue, Newark, N. J.—constructed in 1908.



**12 YEARS OLD**  
**TULSA**

Texaco Sheet Asphalt on South Boston Avenue, Tulsa, Okla.—constructed in 1910.

# They're still



**10 YEARS OLD**  
**CHICAGO**

Texaco Asphaltic Concrete on Grand Boulevard, Chicago, 1911—constructed in 1912.



**9 YEARS OLD**  
**ATLANTIC CITY**

Texaco Sheet Asphalt on New Jersey Avenue, Atlantic City, N. J.—constructed in 1913.

**7 YEARS OLD**  
**MINNEAPOLIS**

Texaco Asphaltic Concrete on East 24th Street, Minneapolis, Minn.—constructed in 1915.





11 YEARS OLD  
BALTIMORE

Texaco Asphalt Macadam on Park  
Heights Avenue, Baltimore, Md.—con-  
structed in 1911.

# going strong

1 is 14 years old  
1 is 12 years old  
1 is 11 years old  
1 is 10 years old  
1 is 9 years old  
1 is 7 years old

and

*and They're still going strong!*

These photographs show only six of the hundreds of TEXACO Asphalt pavements which have been constructed under all kinds of traffic on city streets, and have rendered many years of excellent service.

# TEXACO

The Texas Company, U.S.A.

ASPHALT SALES DEPARTMENT

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New York City



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Cleveland  
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Dallas

When writing to Advertisers please mention THE AMERICAN CITY.



# Concrete Road Building Again Breaks All Records

79,000,000 square yards of Concrete pavement were placed under contract last year — a gain of more than 40 per cent over 1921, the largest previous year.

The construction thus provided for, and to a large extent completed, is equivalent to more than 7,480 miles of 18-foot pavement.

That is a larger amount of Concrete highway than there was in the country altogether up to 1917.

These facts witness the determination of this country to have roads equal to the traffic they bear.

Yet even with this great record, the output of motor vehicles continues to outstrip by far the construction of motor roads.

The revolution in road traffic due to the automobile has called for hole-proof, skid-proof, really enduring pavement; and Concrete fills the need.

That is the explanation of the steady, rapid gain in Concrete road construction during the last decade — the largest development in basic transportation facilities in this country in many years.

## PORTLAND CEMENT ASSOCIATION

*A National Organization  
to Improve and Extend the Uses of Concrete*

Atlanta	Des Moines	Los Angeles	Parkersburg	San Francisco
Boston	Detroit	Milwaukee	Philadelphia	Seattle
Chicago	Helena	Minneapolis	Pittsburgh	St. Louis
Dallas	Indianapolis	New York	Portland, Ore.	Vancouver, B. C.
Denver	Kansas City		Salt Lake City	Washington, D. C.

**Carey Elastite**  
TRADE MARK U.S. Pat. Office

**EXPANSION  
JOINT**



*Above*—Railroad Street, Madison, Wis. Built 1915. Carey Elastite Expansion Joint every 30 feet. Photographed July, 1919.



*At Left*—Illinois State Highway between Dwight, Ill., and Gardner, Ill. Built by State of Illinois W. H. Hartman, Supt. of Construction. Carey Elastite Expansion Joint is used as a concealed center line longitudinal joint, about half of which is the new tongue and groove type.

## Two methods of installing Carey Elastite Expansion Joint in concrete streets and highways

**I**N a section of the Illinois State Highway between Dwight and Gardner the concrete is laid in one apparently continuous slab without transverse joints except at the end of each day's run—a distinctive idea in concrete road construction.

For controlling longitudinal cracks due to changes in temperature, dependence is placed solely on a concealed longitudinal center-line joint of Carey Elastite Expansion Joint installed as the concrete is poured.

The picture of Railroad St., Madison, Wis., shows the usual method of installing Carey Elastite Expansion Joint across the roadway at intervals of thirty feet.

There is no better joint-material for protecting concrete and brick highways against expansion cracks and "blowups." It is scientifically and mechanically right in its construction and performance. It does not chip or shatter in cold weather nor stick or flow in heat. It is easily and economically installed. Carey Elastite Expansion Joint is carried in ample stocks at seventeen convenient shipping centers. Write for sample and data.

### THE PHILIP CAREY COMPANY

8 Wayne Avenue, Lockland, Cincinnati, Ohio

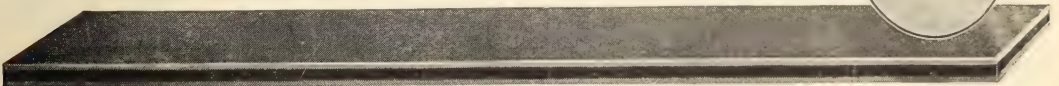
Carey Elastite Expansion Joint is an asphaltic body, sandwiched between two walls of asphalt-saturate felt forming an elastic compressible joint. It is made in lengths, widths, and thicknesses as require 1, 2-23 can be cut to crown or to any special shape and comes to the job ready to use.

#### *Construction of concealed expansion joint*

It is often convenient to install a concealed or submerged longitudinal joint, which allows the finishing machine to operate without interference from joint projecting above the surface.

In this construction, the road is built full width at one operation. Carey Elastite Expansion Joint being set vertically in the road, supported by stakes. The stakes may be driven below the surface and left in the road or allowed to project above the surface and pulled before finishing.

For this construction Carey Elastite Expansion Joint is superior as its stiffness keeps it in position with few stakes.





# Cut Down the Repair Bills

Before you lay another yard of road, give attention to the voice of hundreds of other American Cities, where

## Warrenite - Bitulithic Pavement

has practically eliminated road repair work. Built for service from rugged materials, scientifically proportioned, this pavement gives uninterrupted service long after other type pavements are worn out.

*May we send our booklets?*



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## DIXON'S SILICA GRAPHITE PAINT

is immune from attacks by acids, alkalis, gases and fumes. Impervious to water and not affected by heat or cold.

It dries into a smooth elastic surface and lasts for long periods of time because of the pigment, flake silica-graphite and the vehicle, pure boiled linseed oil.

Dixon's is the only paint in which the graphite and silica are naturally and not artificially combined, and this feature is essential to long life, efficient surface protection, elasticity and resistance to dampness.

Write for Booklet No. 107 B

JOSEPH DIXON CRUCIBLE COMPANY  
JERSEY CITY NEW JERSEY



Established 1827



## Concrete Roads must be reinforced

It is demonstrated beyond doubt that to make concrete roads proof against heavy motor traffic, weather and time a fabric of steel must be incorporated in the concrete.

Several great States have so ruled.

American Steel and Wire Company's

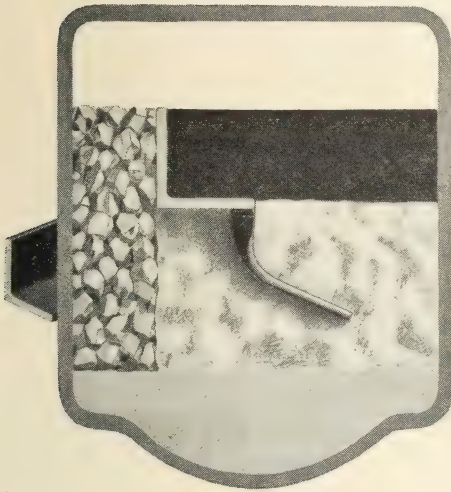
## Concrete Reinforcement

Fulfills every engineering requirement.

*Send for our book on road building*

CHICAGO  
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CLEVELAND  
PITTSBURGH  
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# Save the Road Edge



## International Steel Paving Guard

Concrete headers along car rails are a failure as permanent protection to pavement edges; heavy traffic quickly destroys the header curbs, creating ruts with resultant costly repairs.

Steel Paving Guards—built of structural angle with inch-wide anchors twisted and bent like reinforcing bars—hold the pavement firm and protect the edges. Track work can be performed without disturbing the pavement—railway pavement can be laid to eliminate ruts—and the boundary between road pavement and railway pavement is clearly defined.

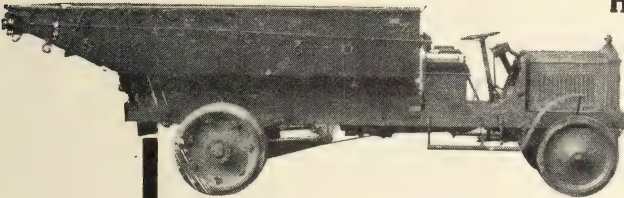
INTERNATIONAL STEEL TIE CO.,

Cleveland Ohio

# WOOD

**DETROIT**

Hydraulic Hoists and Steel Bodies



The dominance of Wood-Detroit Hydraulic Hoists and Steel Bodies in the municipal field is due to two things; the dependability and mechanical efficiency of the Wood-Detroit hoist and the completeness with which Wood-Detroit body engineers have met every city haulage problem.

# Wood Hydraulic Hoist & Body Co.

7924 Riopelle Street

Detroit, Mich.

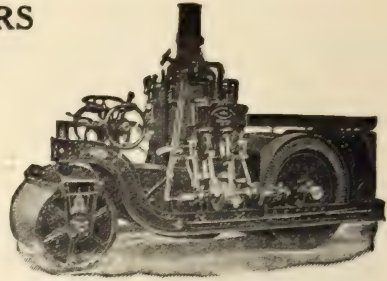


## ERIE TANDEM PAVING ROLLERS

Includes everything that makes for the best in Road Rollers. They are strong, simple in construction—durable and economical and easy to operate. Our first roller built in 1887 is still doing its "bit."

Erie Rollers are guaranteed against breakage or wear for 5 years.

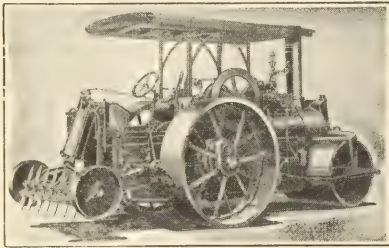
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**THE ERIE MACHINE SHOPS**

**ERIE, PA.**

## QUALITY MACHINERY



With Pressure Cylinder Scarifier

## BUFFALO PITTS ROLLERS

Are purchased by Discriminating buyers due to the many years of satisfactory service which they will render, the low repair costs and their general reliability.

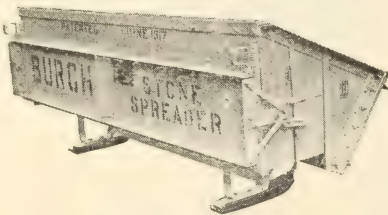
**ALL SIZES—ALL TYPES  
STEAM AND MOTOR ROLLERS**

Users of Buffalo Pitts and Kelly Springfield Rollers should equip rollers with Pressure Cylinder Scarifiers.

*Full information as to cost furnished on request.*

**THE BUFFALO-SPRINGFIELD ROLLER CO.**

**SPRINGFIELD, OHIO**



## For Better Profits

That road contractor who desires profits cannot afford to do business without a

### BURCH SPREADER

It saves its price the first mile—and it does a better job of unloading and spreading stone, slag or gravel on the roadway. Its users are its enthusiastic advocates. Let us send you their testimony.

Burch Unloaders for cars are money-savers too.

**The Burch Plow Works Company**  
Dept. A-2, Crestline, Ohio

## FOR HANDLING CRUSHED STONE or SAND and GRAVEL



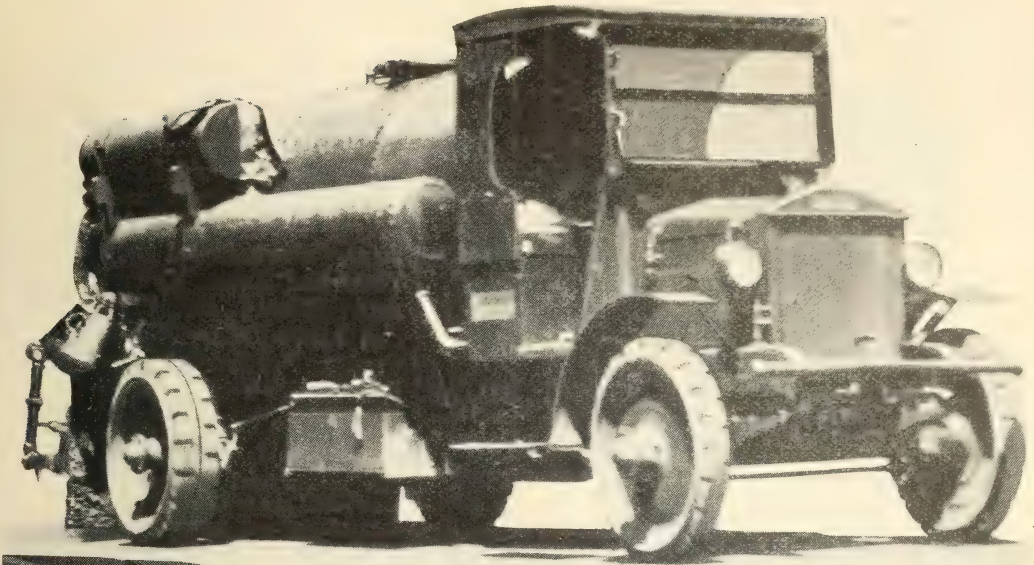
From cars to trucks the **RELIANCE PORTABLE CAR UNLOADER** will save more than its cost in one season.

*Catalog and Price List on Request.*

**UNIVERSAL ROAD MACHINERY CO.**  
KINGSTON, N. Y.

New York Office, 114 Liberty St.

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*Caterpillars are made in sizes suitable  
for trucks of every type and weight.*

## Why Many Cities Choose \*Caterpillar Tires

The picture above shows \*Caterpillar tires on a tarvia-spreading machine owned by the City of Grand Rapids, Michigan.

\*Caterpillars are also used by many other cities on street building trucks, street sprinklers, garbage trucks, fire fighting apparatus and passenger buses.

Why did these cities choose \*Caterpillars in preference to other types of tires?

Simply because \*Caterpillars do the things they want a tire to do—they get traction, they cushion the truck, they deliver mileage and they reduce tire costs.

*\*U. S. Government tests show that cushion tires  
are 50% easier on roads than are solid tires.  
Caterpillars are an advanced type of cushion tire.*

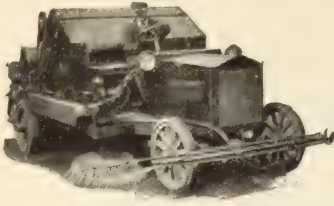
**There is no \*Caterpillar Tire  
but the one that Kelly makes**

KELLY-SPRINGFIELD  
TIRE COMPANY



250 WEST 57th ST.,  
NEW YORK, N. Y.





**\$36,000  
Year**

Five Austin Motor Sweepers save this amount for the Detroit Street Cleaning Department thus paying for themselves each year.

An impartial report made by a Public Investigating Company shows also that these sweepers reduce cleaning costs from 75c to 28c per 1000 square yards.

What Austin Sweepers do for the Detroit Department they will do for you, on a larger or smaller scale as the case may be.

Certified copies of the Detroit and other reports will be sent to interested officials without obligation and the Special Motor Sweeper Catalog as well. Write for them today.

**THE AUSTIN - WESTERN ROAD  
MACHINERY CO.**

**Home Office - CHICAGO**

*Branches, Warehouses and Service Stations  
in 22 Cities.*



## Cast Iron Pipe for Water and Gas

Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials.

*Sizes 2- to 60-inch*

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

**Warren Foundry & Pipe Co.**

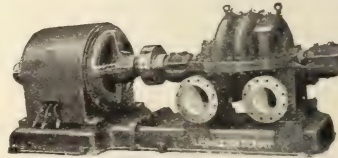
*formerly*

**Warren Foundry and Machine Co.**

*Sales Bowling Green Building, New York City  
Offices: 201 Devonshire Street, Boston, Mass.*

## LECOURTENAY PUMPS

*Centrifugal*



pumping  
machinery  
for every  
kind of  
pumping  
service.

**LECOURTENAY COMPANY**

**8 Maine Street, Newark, N. J.**

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**ELECTRIC CONTROL UNIT**

FOR THE MOTOR OPERATION OF LARGE  
GATE AND GLOBE VALVES

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For Heating and Applying under Pressure all varieties of Bituminous Materials, Hot or Cold, for Road Construction, Maintenance or Dust Laying.

Heat and volume under instant control of operator. Positive pressure produced by the Kinney Pump.

## PATENT COMBINATION Auto Heater and Distributor

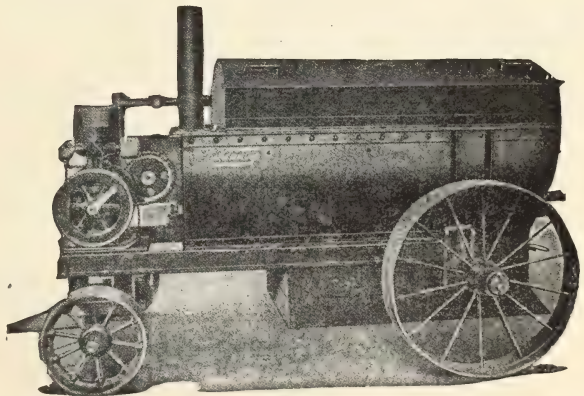


## HANDY HEATER and SPRAYER

Especially adapted for Road maintenance, construction and general repair work. Contents constantly agitated while heating.

No burning or coking of material. Pump, Piping, Hose, Nozzles, Automatically Heated.

No Steam Required.



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## HEIL DUMP BODIES FOR FORDS

Get the most out of your municipal Ford Truck! A standardized Steel Body and Underneath Hand Hoist has been added to the line of Heil "Quality" equipment for mounting on Ford Trucks. Just the thing for ash or rubbish collection or any kind of general hauling.

The Hoist mechanism is very simple, installed under the body so that all loading space back of the cab is used. Body may be locked in any position of elevation.

*Prices and Literature on Request*

**THE HEIL CO.**

1242-60 26th Avenue,

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## Good Roads And The Russell

When you think of Good Roads think of "Russell" - a name identified with the best in road construction for 15 years.

Russell Machines are positively built right. We have embodied some real thought and science in their design and construction. They are models of simple operation and efficiency and they have extra strength built into all of the parts we know are most likely to be put to unusual and severe demands. This is the answer to the oft repeated truth, "You can always depend on a Russell in a pinch."

They do even more than expected and fully measure up to every requirement for speedy and economical work.

Everything needed for road construction, road maintenance, and road repairing—

**7 Sizes Road Machines—3 Sizes Elevating Graders—**  
Maintenance Patrol Machines for both Motor and Horse Power, Scarifiers, Road Drags, Drag and Wheel Scrapers, Drag Lines, Gravel Screening and Loading Equipment, Culverts, Steel Beam Bridges, etc.

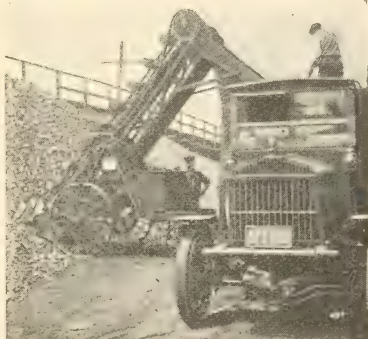
*A very complete catalog of special interest to all road builders—*  
*sent free and postpaid.*

**RUSSELL GRADER MANUFACTURING COMPANY**

FACTORY AND GENERAL OFFICES  
MINNEAPOLIS, MINN.

*Representatives in all principal cities.*

*Affiliated Plants—Colum. Ill., North Kansas City, Mo.,  
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## HAISS WAGON LOADERS

are strong, durable machines with a capacity for work that has caused them to be the choice wherever loose materials are to be handled.

**They save labor, time and money.**

*Write for Bulletin No. 521.*

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Established 1892

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H-93

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—The ELGIN Line—

The AUTOSWEEPER

A Motor Street  
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A Motor Pick-Up  
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The AUTO-EDUCTOR

A Motor Catch-Basin  
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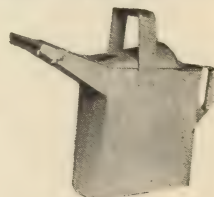
**ELGIN SALES CORPORATION**

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## "TARCO" Welded Equipment

Pumps  
Conveying Spouts  
Asphalt Kettles  
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Special Pumping Outfits  
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Push Brooms  
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**TARRANT MANUFACTURING CO.**

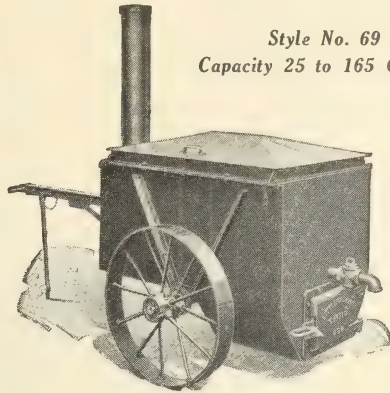
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# **LITTLEFORD**

== TAR AND ASPHALT HEATERS ==

## **FOR ROAD AND STREET MAINTENANCE**



*Style No. 69  
Capacity 25 to 165 Gallons*

**M**AINTENANCE of your roads and streets must be continuous so as to withstand the stress of everyday traffic. Those small breaks or worn spots in the pavement should be permanently repaired before they become serious by applying hot bituminous patches. Heated tar and asphalt can be conveniently provided by equipping your repair department with Littleford Tar and Asphalt Heaters which are made in various styles to suit individual requirements with capacities ranging from 10 to 900 gallons.

*Our complete catalogue of paving tools and equipment may be had by writing.*

**LITTLEFORD BROS.**

**500 E. Pearl St.**

**Cincinnati, O.**





# DELUGE *Ford* CHEMICAL AND HOSE TRUCK

Equip your town and the sparsely settled portions of your city with "Deluge" apparatus, the most efficient, durable and reliable fire-fighting machine on the market to-day. Send for prices and specifications.

## SIMPLE-STRONG-RELIABLE

"Deluge" equipment is good insurance. It is built for service and constructed of the best material and workmanship.

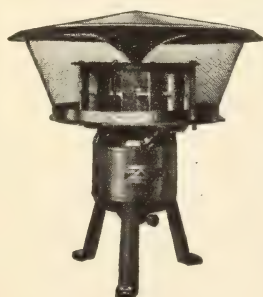
THE PROSPECT MFG. CO.  
P. O. BOX 515 PROSPECT, OHIO

## FOR VOLUNTEER FIRE DEPARTMENTS

one of these SIRENS will make every telephone in your town a FIRE CALL box.

Your central can push the button, instantly every fireman no matter where he sleeps or works knows there is a Fire.

YOU WILL FIND THE ERICK SIREN the LOUDEST, NEATEST and BEST MADE. IT IS

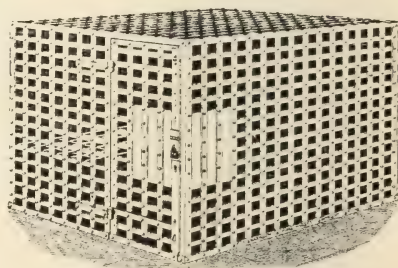


S L E E T -  
PROOF and  
throws the  
sound equally  
in all directions

Erick Electric  
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97 S. WABASHA,  
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## CELLS

*of every description*

*Complete Catalog Mailed on Request.*

E. T. BARNUM IRON WORKS  
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## SOMETHING NEW IN DUMP WAGONS



For hauling garbage, ashes, tin cans, etc.

Why use three wagons when ONE will do the work?

Our wagon has extra large capacity, low-hanging bed, easy to load and dump.

**STRONG AND DURABLE**

*Write us for further details.*

**GEO. H. HOLZBOG & BRO.**

Manufacturers of steel and wooden-bed vehicles.

JEFFERSONVILLE, INDIANA

# TAR AND ASPHALT HEATERS CONNERY

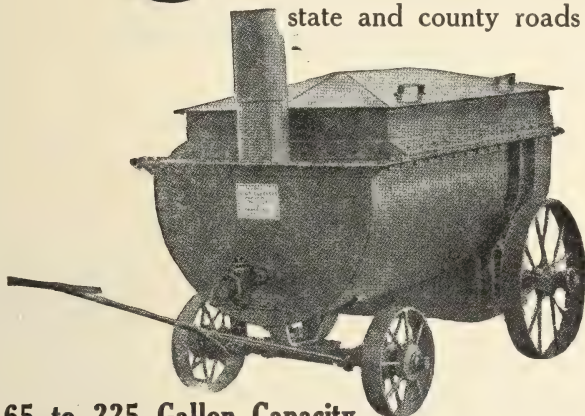
NON-LEAKABLE WELDED

"Held by the Weld"



## 10 Gallon Capacity

This style kettle is made especially for small patch work where there are a considerable number of small holes to be properly filled up with gravel or crushed stone and cemented with a bituminous binder. The inside pot lifts out and can readily be used as a pouring pot. A large number of Style P kettles have been put into use by division superintendents on state and county roads to patch small holes.



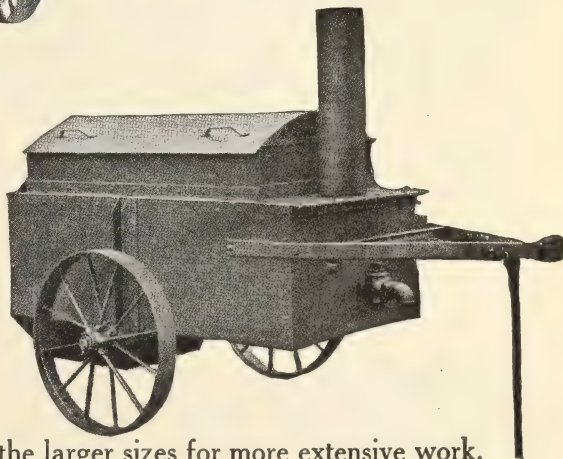
## 300 to 500 Gallon Capacity

The Style B Kettle shown at the left has a lined fire-box with cast iron grate bars and is made to burn wood, coal or coke. It is equipped with a draw-off cock at the front. All tanks are Connery "Held by the Weld" type, which eliminates leaks.

## 65 to 225 Gallon Capacity

This kettle contains most of the features of the style B kettle shown above except that it is of smaller capacity and does not come equipped with barrel hoist and warming hood as in the kettle above.

Connery kettles are known throughout the country as standard for street and road work, whether our smallest size, Style P, shown above, or the larger sizes for more extensive work.



"Double Electric Welded"

# CONNERY & CO., Inc.

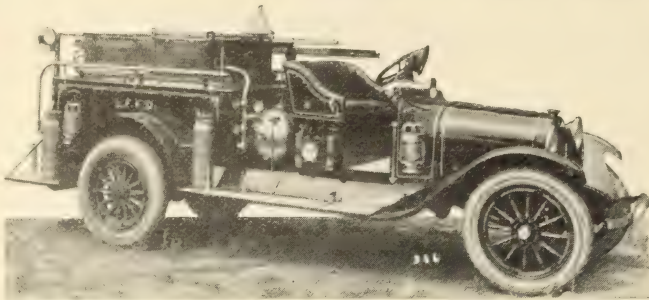
4000 North Second Street

PHILADELPHIA, PA.



# MOTOR FIRE APPARATUS

For the Smaller Cities and Towns



*"Childs"  
Combination  
Chemical and  
Hose Car on  
Dodge-Graham  
Truck Chassis*

HIGH GRADE APPARATUS AT LOW COST

## FOAMITE-CHILDS CORPORATION

A Consolidation of Foamite Firefoam Co. and O. J. Childs Co., Inc.

*Fire Protection Engineers and Manufacturers*

Factory and Executive Offices  
302 Turner Street, Utica, N. Y.

Sales and Engineering representa-  
tives in the leading cities

# FABRIC FIRE HOSE

is of an unusually careful manufacture  
**WAX and PARA GUM TREATED**

**The lining is of fine Para Gum, hand made,  
four calendered, smooth bore or lap-jointed**

Circular balance woven, each strand of cotton is treated to a bath of melted Wax and Para Gum, then cabled and woven into the jackets.

Absolutely waterproof, making the ideal hose for fire departments.

Treatment lubricates and solidifies the strands of cotton, assuring long wear.

*Made in all sizes from 1 to 6 inches inside diameter.*

**FABRIC FIRE HOSE CO.**  
**COR. DUANE & CHURCH STS., NEW YORK**

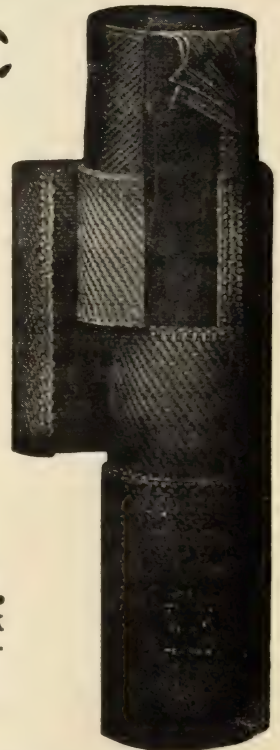
### Branch Offices

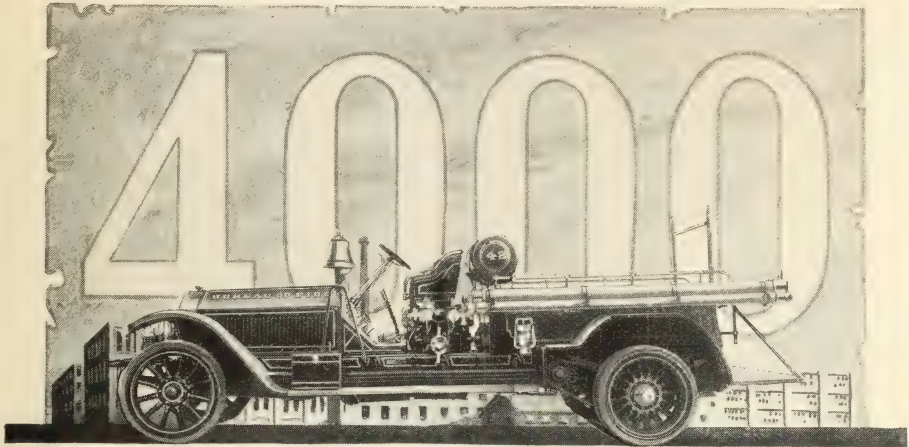
CHICAGO, ILL.  
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## Superiority Brings Production Past the 4,000 Mark

A pumping car which we shipped to Philadelphia recently brought the total of American-LaFrance Fire Apparatus in service above 4,000.

What more glowing testimony could be asked as to the skillful engineering, the sturdy construction, the superior materials and the quality of workmanship that go to make up American-LaFrance Fire Fighting Apparatus.

Many of our fire trucks have seen more than ten years of service, and time after time have established unparalleled records both as to distances run to fires and to the length of time they have pumped.

These records, together with the fact that our great production has put American-LaFrance Apparatus in 90 per cent. of America's fire departments, show conclusively that it is the world's greatest fire apparatus.

Chiefs who want the best invariably favor American-LaFrance.

## AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

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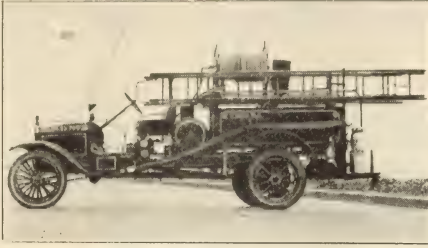
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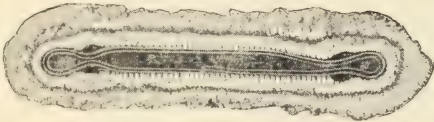
## "PIRSCH" Fire Equipment

BUILT AND MOUNTED ON  
ANY STANDARD CHASSIS

PIRSCH Apparatus or Equipment in  
service in over one thousand depart-  
ments—Write for details.

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Bi-Lateral Fire Hose construction  
keeps the rubber from cracking or  
leaking. If you want the best fire  
hose at the lowest cost per year of  
service, send for our catalogue.

**Bi-Lateral Fire Hose Co.**  
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## ELECTRIC SIRENS

**THE SIRENO COMPANY**  
STATEN ISLAND  
NEW YORK

## 796 FEET ABOVE BROADWAY



**AN AHRENS-FOX  
RECORD**

Inside the Fire  
Lines—Ahrens-Fox  
Piston Pumps are  
known as the Hard  
Hitting Pinch Hit-  
ters.

ASK THOSE  
WHO KNOW


**THE AHRENS  
—FOX FIRE ENGINE CO.**

Cincinnati, Ohio

# NORTHERN

ROTARY

# PUMPS



"MORE GALLONS PER HORSE POWER"

## Our Trade Mark Tells Our Story

Over six hundred Northern Rotary  
Pumps are in Fire Department ser-  
vice and the number is rapidly in-  
creasing.

*Let Us Tell You Why*

## NORTHERN FIRE APPARATUS CO.

MINNEAPOLIS, MINNESOTA. U.S.A.



## *The Last Alarm*

The last of New York's famous fire horses have made their final run. The "three horse hitch" has passed into Department history.

Modern fire apparatus with its motor-driven pumps makes the use of *good* hose an even greater factor of your equipment than it was with the horse-drawn steam engine.

Paragon and the other standard brands of Eureka manufacture are standing the gaff of increased pressures along a thousand fire lines.

## **United States Rubber Company**

EUREKA FIRE HOSE DEPARTMENT

27 Barclay Street

New York

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Canco Galvanized Ware includes garbage and ash cans and pails, street cleaning cans, trash cans and rubbish burners, in many styles and sizes.



## All the ashes

**A**SH collection is either a nuisance or an incident. In some cities the ash man leaves a gray and gritty trail; in enlightened communities he takes away a covered can with all the ashes, leaving a clean empty one behind.

The same thing applies to garbage. And where you find modern collection and disposal systems, you are likely to find cans of Canco manufacture. Look for the name "Canco". It means extra good galvanized ware.

Write for descriptive leaflet, to our Toledo factory, Toledo, Ohio.

**American Can Company**



Shipped on Approval.

Write for Proposition.

**ECONOMY BALER CO.**

Dept. A.C.

ANN ARBOR,

MICH.



## CLIMAX HOUSE NUMBERS

A new principle in house numbering. Can be seen at all times.

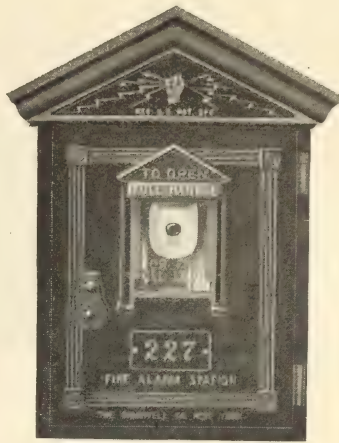
Figures are pure aluminum 3 inches high and set in a black Japanned frame.

We can help you renumber your city. Write for circular.

**The Hamilton Metal Products Co.**  
Hamilton, Ohio.



**PULL LEVER**



**PULL HANDLE**

## **QUICK ACTION DOOR**

**no glass to break---**

Guardite—a new substance similar to that used in automobile windows—has taken the place of glass in the “key-guard” of this new box. All danger of cutting the hands of anyone operating the box is thus eliminated.

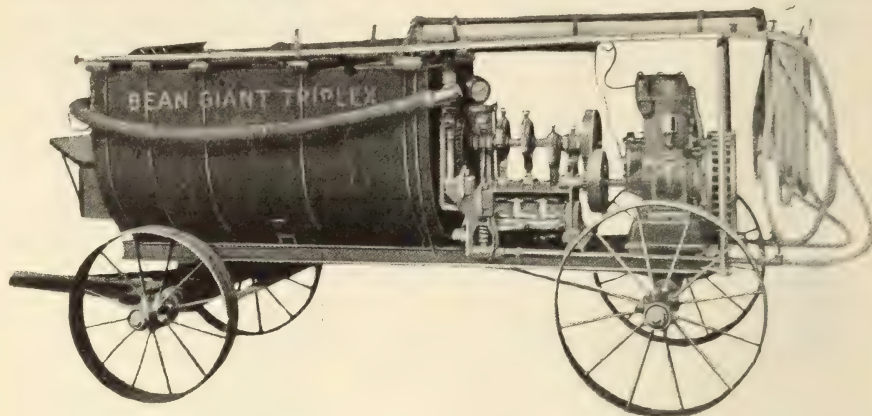
This door is standard equipment with the NEW PEERLESS PORCELAIN STEEL BOX. It can be attached to all your present Peerless or Ideal Boxes. Ask our nearest agent or the factory to make you a special proposition to replace all of your old style doors with this improved door which speeds up the sending of the alarms.

## **The Gamewell Company**

**Newton Upper Falls, Mass.**



**High Capacity - Sure Efficiency - Great Economy  
At Low First Cost  
BEAN POWER SHADE TREE SPRAYER**



You get all of this and more in Bean Sprayers. A size for any requirement—that means lost cost of caring for your city shrubbery and shade trees. Most cities buy Bean sprayers after investigation. They buy where they can get the most for their money. Now And Later. **Send for catalogue 38A today.**

101 Hosmer St.,  
Lansing, Michigan.

**BEAN SPRAY PUMP CO.**

101 Julian St.  
San Jose, California

***The Only Practical Automatic Stream-Controlled  
Drinking Fountain***



Note how the two streams converge as they rise. In converging these streams set up a mechanical interference in the stream that retards the movement of the water at the apex of the arc, building a convenient, comfortable drinking mound.

When low water pressure makes it necessary for the mouth to come in contact with the water outlet of a drinking fountain it's dangerously unsanitary.

When high water pressure throws a stream of water full in the face of the drinker, it's at least annoying. Halsey Taylor Drinking Fountains are now constructed with perfect automatic stream control, which maintains a uniform height of stream even though the line pressure varies fifty pounds.

Not only this, but there is that exclusive Halsey Taylor localized drinking mound, which discourages drinking any other place in the stream and keeps the mouth away from the water outlet.

*Write today for complete catalog.*

**The Halsey W. Taylor Co.  
WARREN, OHIO**



Halsey Taylor No. 616.  
Vitreous China Pedestal  
Fountain.

**HALSEY TAYLOR**  
**DRINKING-Puritan FOUNTAINS**



# How About Fire?

LAY aside for a moment the comfort and sanitary advantages of an adequate modern water system and turn your attention exclusively upon the matter of fire protection.

Think what one fire that cannot be controlled could do to your community. Every day the newspapers carry accounts of fires that have wiped out great areas. Fire means losses in life, property and efficiency.

Fires need not be a menace, will not be if you have the right kind of a water system. Fire-fighting apparatus and sprinkling systems are all necessary, but first there must be *water*. The easiest, most economical method is to let Pittsburgh-Des Moines Tanks solve the problem.

Des Moines Tanks are designed by our own engineers, fabricated in our own shops and erected by trained men permanently in our employ.

We will be glad to undertake part or whole of the work of installing your water system, following the entire job from conception to completion, wherever possible. Our consulting engineering staff is at your disposal. Submit your problems to them without obligation.

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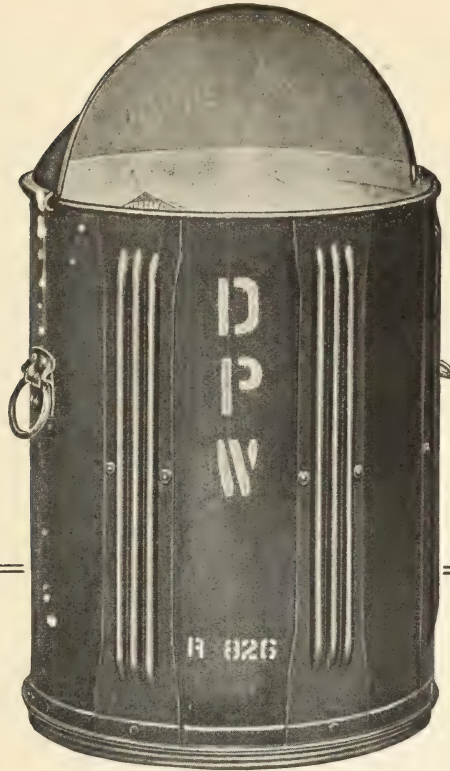
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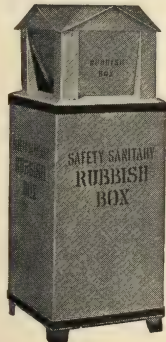
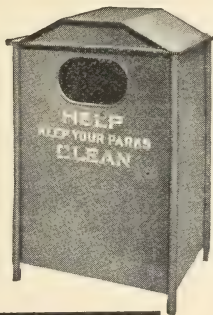
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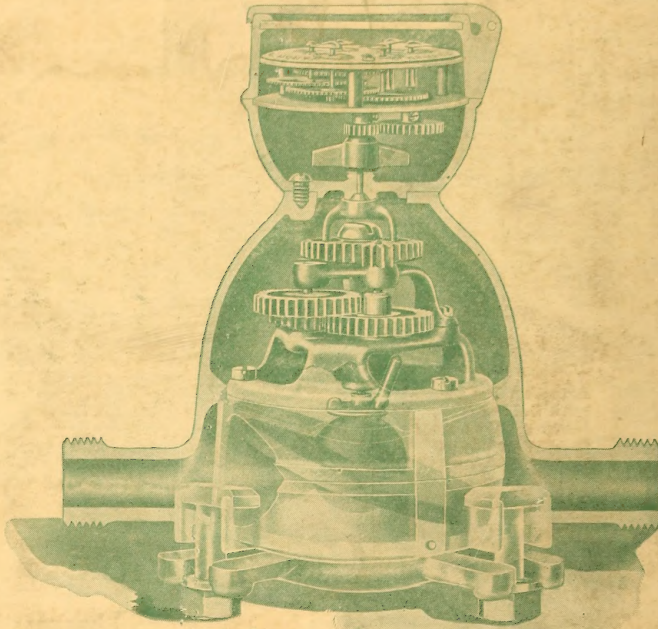
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